QUALITY ASSURANCE OF FLOWS ON THE RIVER OUSE

LOIS Working Note No. 1

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1 Introduction

The National River Flow Archive (NRFA) provides a central database of river flows at gauged National River Authority (NRA) stations. In general the NRFA data are quality inspected to ensure that discrepancies or discontinuities in flows over time do not occur for individual NRA stations. While this procedure also identifies problems with particular gauging stations such as summer weed growth or backing up at tributary junctions, the significance of such errors in downstream accumulations of flows is not addressed. Consequently, work reported here looks at daily time series and annual flows from all NRA stations in the Ouse catchment down to Skelton near York, in order to provide a spatial description and quality assurance of gauged flows in the catchment.

A basic quality assurance test is carried out by looking at cumulated flows from each station along the main tributaries to the River Ouse. Annual totals are also examined and station files investigated to give complementary information on each gauging station. Figure 1 shows the main rivers, namely the Swale, the Nidd and the Ure. The Ouse is formed by the confluence of the rivers Swale and Ure. All NRA gauging stations are also shown, with the numbers on the map being the last two digits nn of the full station number which is of the form 2700nn.

2 Analysis of the flows in the Ouse catchment

2.1 AVAILABLE FLOWS

A summary of the data available for each station (omitting headwater gauges) over the twenty year period 1973 - 1992, with years when there are incomplete data, is given in Table 1. A full monthly gauged discharge summary for all years is given in Appendix 1 in which the stations are listed in numerical order. Due to the station at Richmond being discontinued after 1980 and the introduction of the station at Bedale Beck in 1983, it was decided that the years 1980 and 1983 would be analysed. It should also be noted that the stations at Leckby Grange and at Crakehill on the River Swale are considered in the NRFA records to be identical. The final number of stations used in the analysis of the main rivers is 13.

Figure 1. Gauging stations within the Ouse catchment.

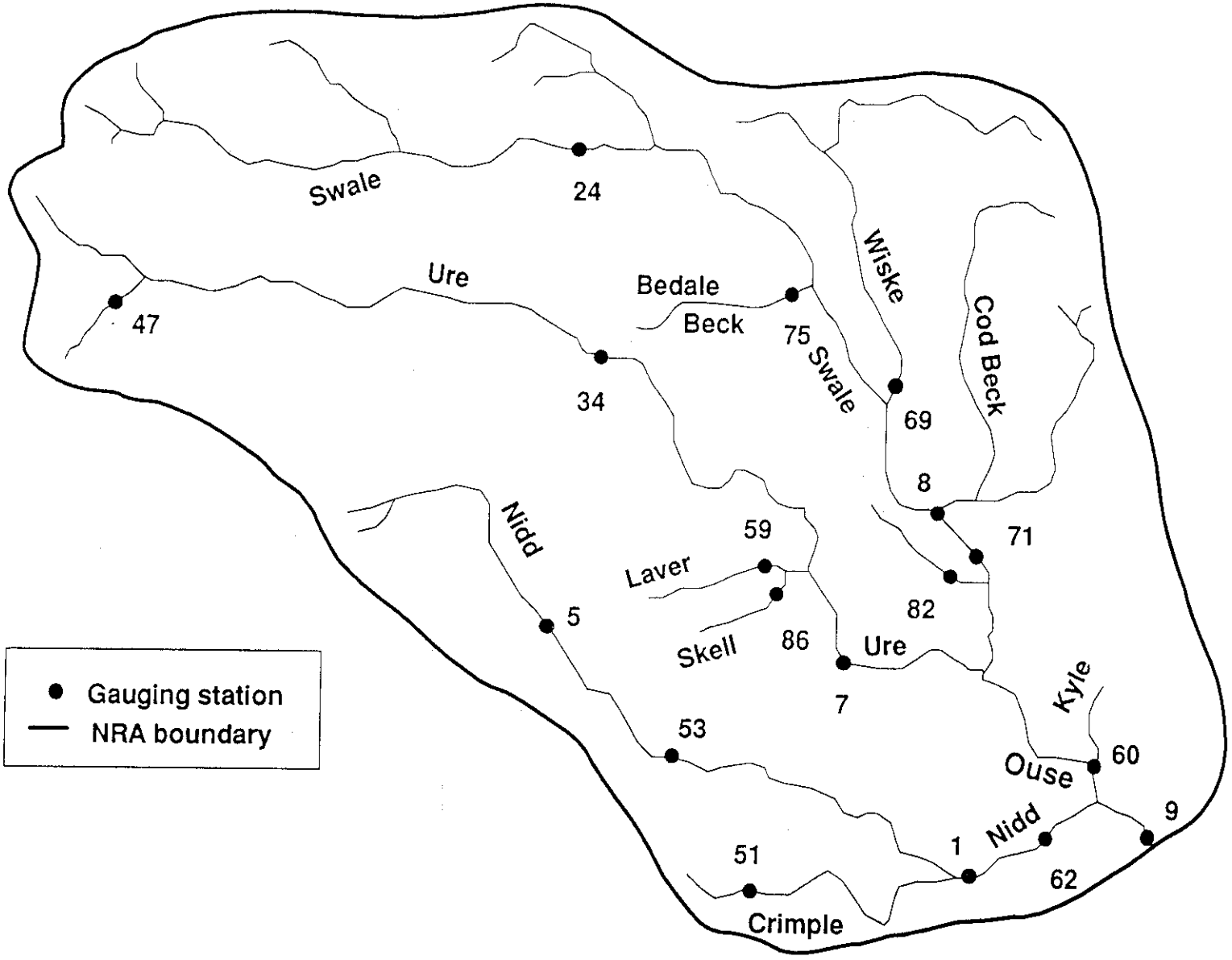


Table 1: Ouse flows available from National River Flow Archive in the period 1973-1992

Station Number	Period of Record	Station	Years with missing data > 20 values
27024	1973-1980	Swale at Richmond	1976, 1980
27075	1983-1992	Bedale Beck at Leeming	1983
27069	1980-1992	Wiske at Kirby Wiske	1980
27008	1973-1984	Swale at Leckby Grange	1975-1977, 1979
27071	1973-1992	Swale at Crakehill	1975-1977, 1979
27082	1987-1992	Cundall Beck at Bat Bridge	
27005	1973-1980 1982-1990 1992	Nidd at Gouthwaite Reservoir	1983
27053	1975-1992	Nidd at Birstwith	1975,1976
27051	1973-1992	Crimple at Burn Bridge	1975, 1979, 1982
27001	1973-1992	Nidd at Hunsingore Weir	1984, 1985
27062	1979-1992	Nidd at Skip Bridge	1979, 1981
27047	1973-1992	Snaizeholme Beck at Low Houses	1979, 1981, 1983 1984, 1985, 1986
27034	1973-1992	Ure at Kilgram Bridge	
27059	1977-1992	Laver at Ripon	1977, 1979, 1980
27086	1984-1992	Skell at Alma Weir	1984-1991
27007	1973-1992	Ure at Westwick Lock	1978, 1979
27060	1979-1992	Kyle at Newton on Ouse	1979
27009	1973-1992	Ouse at Skelton	1991

2.2 STATION FILES INFORMATION

Station files (see Appendix 2; again in numerical order of gauging station) include a description both of the catchment and gauging station, and provide valuable infomation regarding problems at particular gauging sites. Several stations in this investigation have required a closer scrutiny due to inconsistencies in their flow in comparison to nearby sites or the catchment area covered by the station. These stations along with appropriate comments on their accuracy are given below.

Nidd at Hunsingore Weir - 27001

This is a broad-crested weir with a by-pass sluice since 1980 which has led to subsequent revised flows. It is regarded as being insensitive at low flows. The station at Skip Bridge is recommended to be used in tandem with this station for low flows.

Nidd at Skip Bridge - 27062

This is a limited range flat V weir, subject to drowning and inaccuracy at high flows. Intended for use in conjunction with the gauge at Hunsingore Weir.

Wiske at Kirby Wiske - 27069

This is a flat V weir, subject to drowning and backing up from the Swale. Weed growth can also affect low flows. Reverse flows observed under low flow conditions. Flows should be treated with caution.

Bedale Beck at Leeming - 27075

This is a flat V weir, which drowns at high flows as a result of backing up from the Swale.

Kyle at Newton on Ouse - 27060

This is a flat V weir, whose flow record is very inaccurate above the low flow range, and the weir is subject to drowning due to backing up from the Ouse whose confluence is just downstream. The high flows and runoff total are erroneous with substantial overestimation.

Ouse at Skelton - 27009

This is a velocity-area station. Public water supply abstraction upstream has an impact on very low flows, but there is some artificial ground water augmentation to counterbalance this influence.

2.3 FLOW ACCUMULATION ALONG THE MAIN RIVERS

Figures 2 - 5 show the cumulative flows for 1980, for all the available stations on the rivers Swale, Nidd, Ure and Ouse respectively. The legends in these figures are placed in decreasing order of the catchment area covered by that station (see Table 2 for details), with the top legend having the largest area. Figures 6 - 9 show the corresponding flows for 1983. Table 2 also gives the daily mean annual flow, as calculated by taking the total cumulative flow for a year and dividing by the number of days in the year, for each station in 1980 and 1983. This table also shows the mean annual rainfall for the period of record given in Hydrometric Register and Statistics 1986-90 (Marsh and Lees, 1993).

From the cumulated flows of Figures 2 and 6 for the river Swale, it is evident that the contributions from the gauging stations at Richmond, the River Wiske and Bedale Beck are

a small proportion of the flow observed at the downriver station at Crakehill. From the daily mean flow averaged over the two years, it is evident that the Richmond, Wiske and Bedale Beck flows come to approximately 70% of that measured at Crakehill. This is due to the fact that these gauged flows are derived from the area of the upland catchments covered by the three stations. This area is only 55% of the area covered by the Crakehill station (a straight proportionality between flow and area is not evident since rainfall totals are higher for the upstream catchments - see Table 2).

Table 2: Catchment areas, mean annual rainfalls and annual flows for 1980 and 1983 for the Ouse gauging stations considered in this study

Station Number	Station	Catchment area (km^2)	Daily Mean Annual Flow 1980 (cumecs)	Daily Mean Annual Flow 1983 (cumecs)	Mean rainfall (mm)
27024	Swale at Richmond	381.0	9.60	-	1211
27075	Bedale Beck at Leeming	160.3	-	2.29	668
27069	Wiske at Kirby Wiske	215.5	3.26	3.90	640
27008	Swale at Leckby Grange	1345.6	23.54	20.29	851
27071	Swale at Crakehill	1363.0	23.54	20.29	864
27082	Cundall Beck at Bat Bridge	25.0	-	-	592
27005	Nidd at Gouthwaite Reservoir	113.7	3.02	2.47	1368
27053	Nidd at Birstwith	217.6	5.41	5.41	1321
27001	Nidd at Hunsingore Weir	484.3	10.21	8.71	969
27062	Nidd at Skip Bridge	516.0	14.24	14.62	1019
27034	Ure at Kilgram Bridge	510.2	16.90	15.84	991
27059	Laver at Ripon	87.5	1.00	1.12	1351
27007	Ure at Westwick Lock	914.6	21.94	21.82	1131
27060	Kyle at Newton on Ouse	167.6	12.91	10.52	678
27009	Ouse at Skelton	3315.0	61.32	47.32	946

Figure 2. Cumulative flows for the River Swale (1980)

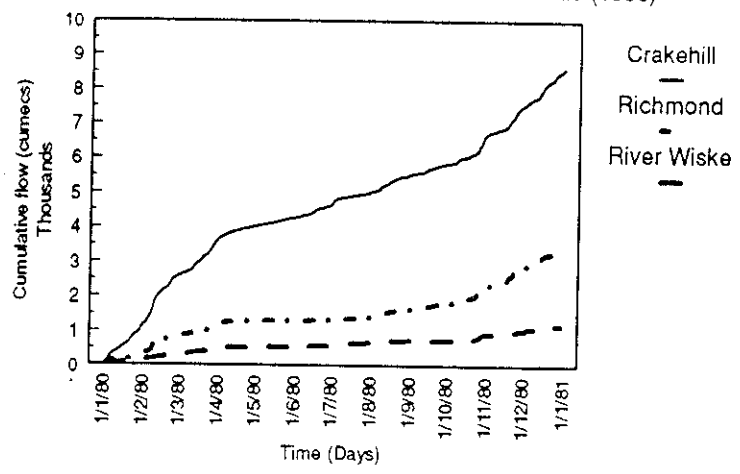


Figure 3. Cumulative flows for the River Nidd (1980)

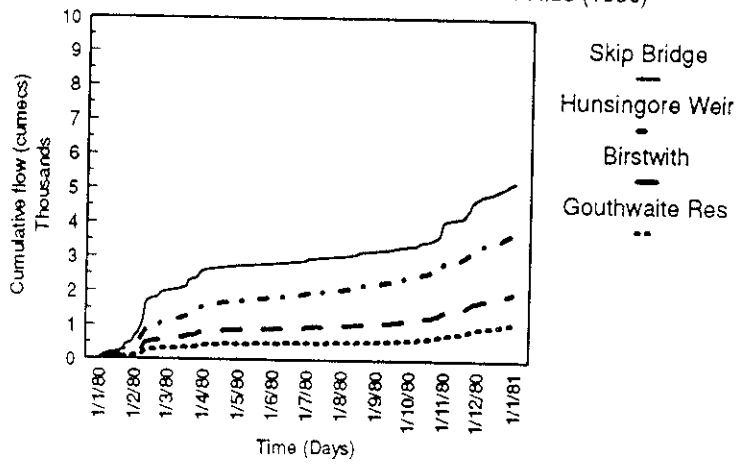


Figure 4. Cumulative flows for the River Ure (1980)

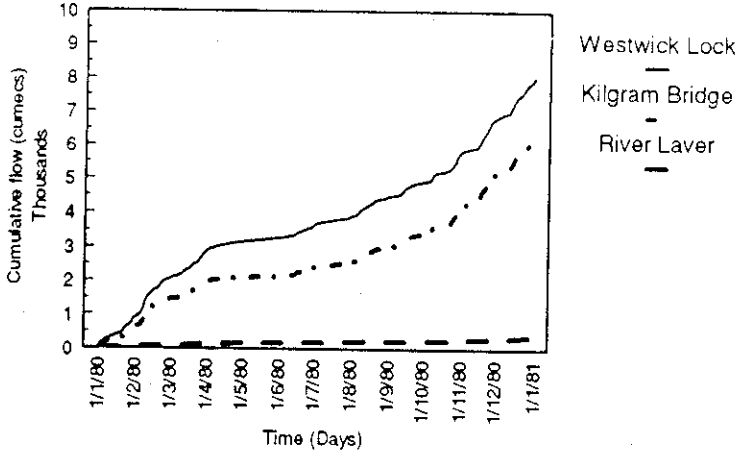


Figure 5. Cumulative flows for the River Ouse (1980)

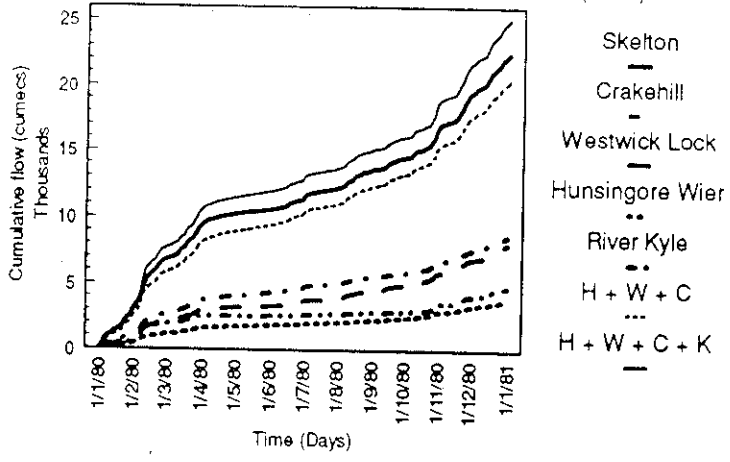


Figure 6. Cumulative flows for the River Swale (1983)

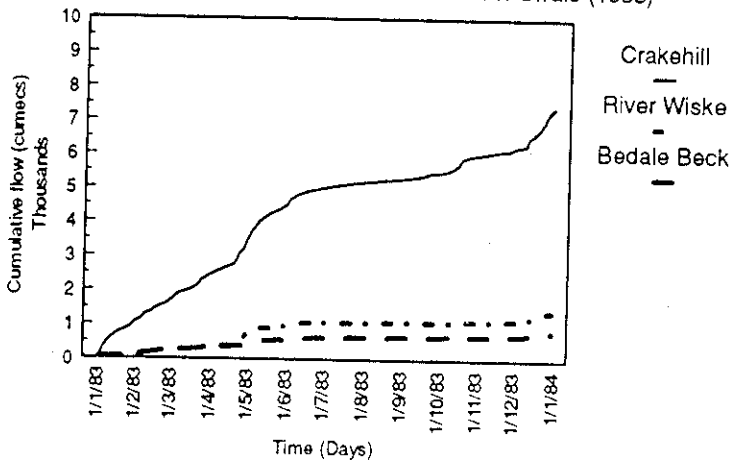


Figure 7. Cumulative flows for the River Nidd (1983)

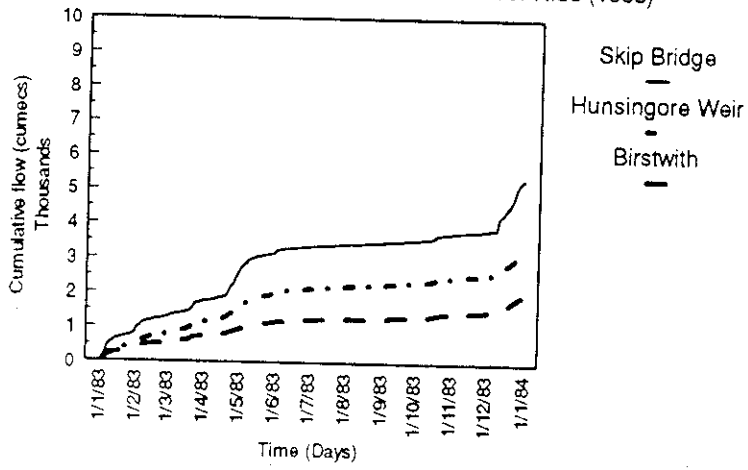


Figure 8. Cumulative flows for the River Ure (1983)

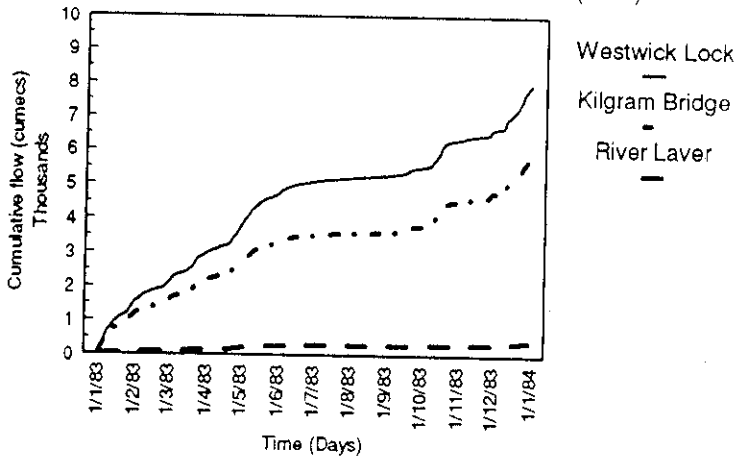
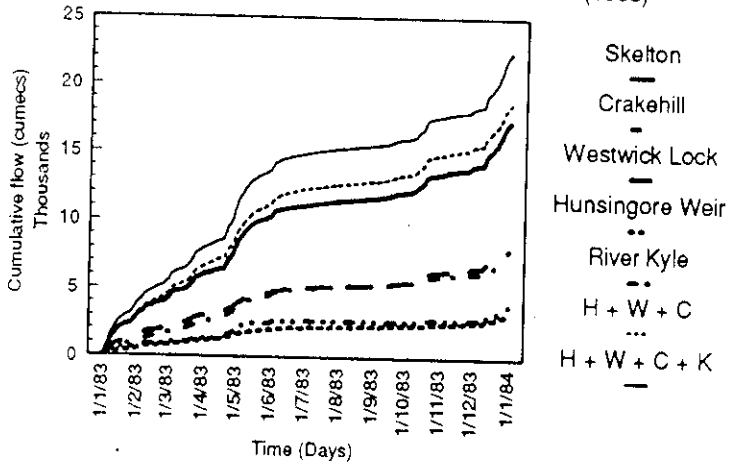


Figure 9. Cumulative flows for the River Ouse (1983)



The cumulative flows for the River Nidd, Figures 3 and 7, gradually increase in moving downstream from Gouthwaite Reservoir to Skip Bridge. From Table 2 it is apparent that the annual flows for the gauging stations are approximately proportional to the catchment area. This is a fortuitous result since a large proportion of the water from the upper Nidd (above Gouthwaite) is used extensively for water supply. Gouthwaite Reservoir itself is used purely for compensation flows.

Figure 10 illustrates the water transfer system of the upper Nidd (Naden and McDonald, 1989). The two water supply reservoirs of Angram and Scar House above Gouthwaite have a combined catchment area of 22 km^2. In addition to this, water from the upper catchments of the left-bank tributaries in the adjacent How Stean catchment is piped through to Scar House Reservoir. The total area from which water is abstracted in this manner is 18 km^2, almost doubling the catchment area to Scar House and, in combination, making up 35% of the total catchment area to Gouthwaite. However, the intakes in the How Steen catchment may be turned out during times when the reservoir is full or, more recently, to divert poorer quality water, received during the early autumn, from supply. Furthermore, water from Scar House Reservoir is taken to Chellow Heights water treatment works in Bradford via a gravity-feed aqueduct and system of syphons. This aqueduct may pick up additional water directly from the rest of the How Stean catchment and the headwaters of Blayshaw Gill, Ramsgill Beck, Colt House Gill and Burn Gill as its crosses them. It is not possible to estimate the likely flow losses via this direct inflow into the Nidd aqueduct as these will depend on the flow in the rivers as well as the flow within the aqueduct itself. While it is worth noting these losses in the context of catchment modelling, each of the tributaries affected flows into the Nidd above the Gouthwaite gauging station and should not, therefore, affect the water balance within a river flow model such as QUASAR.

Further downstream, at Skip Bridge the annual flow appears to increase by 40% with respect to Hunsingore for only a small increase of 6% in the catchment area. Referring to the gauging station details it is apparent that the gauge at Skip Bridge suffers from drowning effects and so is inaccurate at high flows. Hunsingore Weir is insensitive at low flows, but is generally more reliable over a whole year. Figures 11 and 12 show the daily flows for these two stations for 1980 and 1983. From these figures a threshold value of 20 cumecs is recommended, above which the flows at Hunsingore Weir should be used, otherwise the flows at Skip Bridge should be used. The flow at Gouthwaite Reservoir is only approximately 30% (averaged over the two years) of that at Hunsingore Weir. In this case, no tributary inflows are gauged, with the exception of one of the headwaters of Crimple Beck, and the catchment area of Gouthwaite is only 23% of the total catchment area at Hunsingore Weir.

The River Ure cumulative flows are shown in Figures 4 and 8. The flow from Westwick Lock follows that of Kilgram Bridge, but is approximately 25% (average value) greater due to additional inflows. Combining the flows from Kilgram Bridge and the River Laver leads to a flow approximately 80% (average value) that at Westwick Lock. The total catchment area to Kilgram Bridge plus that of the Laver is only 65% of the area to Westwick Lock. The gauging station on the River Skell did not start monitoring until 1984, and so was not included in this study. Looking at the data for the Skell post 1984, it is seen to contribute approximately the same flow as the Laver.

Finally, the flows for the River Ouse are shown in Figures 5 and 9. Using the information in Table 2, the total contributions from the rivers Swale (Crakehill), Nidd (Hunsingore) and Ure (Westwick) add up to approximately 91% and 107% of that observed at Skelton for 1980 and 1983 respectively. This is within the experimental errors (±10%) associated with each station.

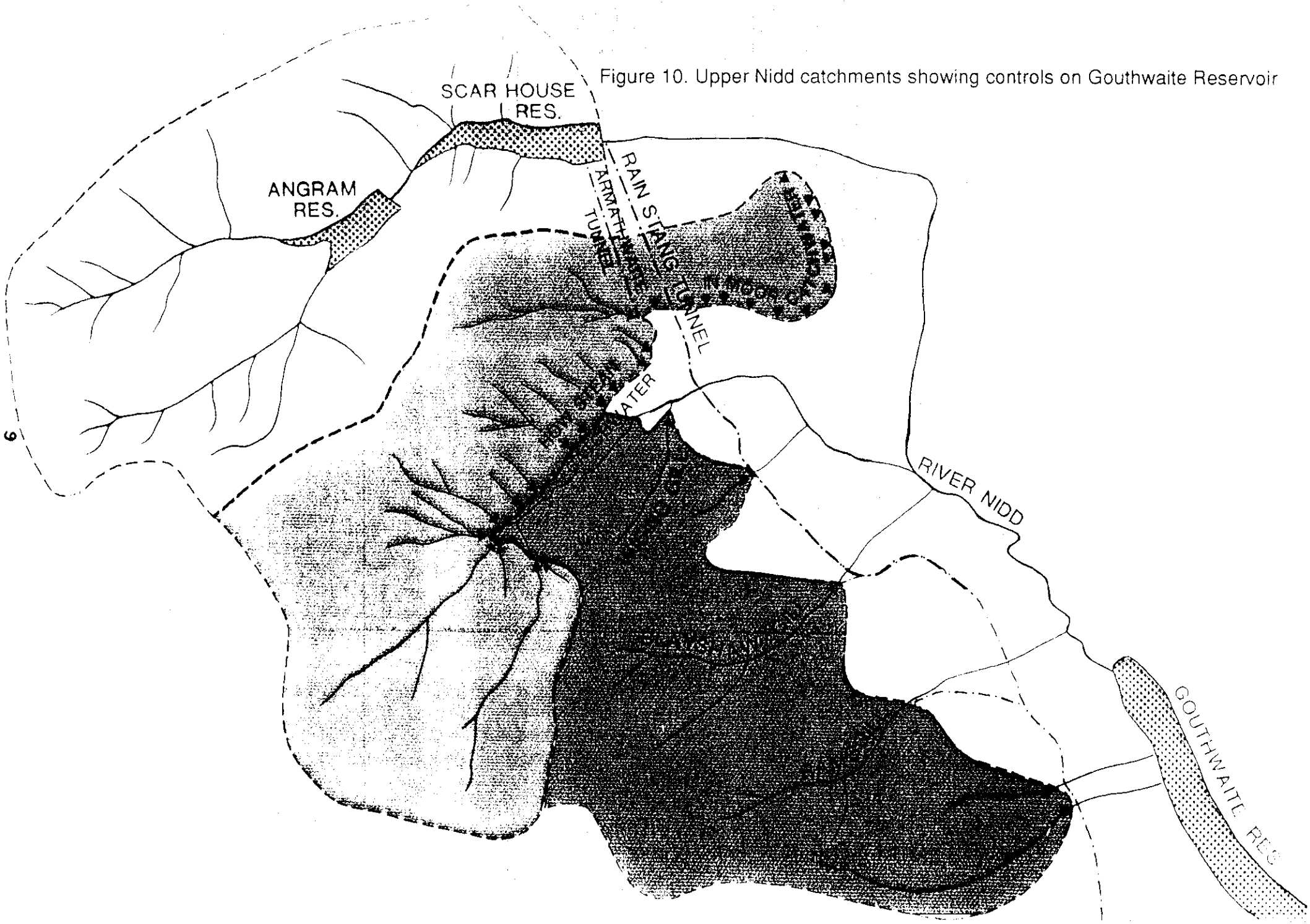


Figure 10. Upper Nidd catchments showing controls on Gouthwaite Reservoir

Figure 11. Flows for the downstream stations on the River Nidd (1980)

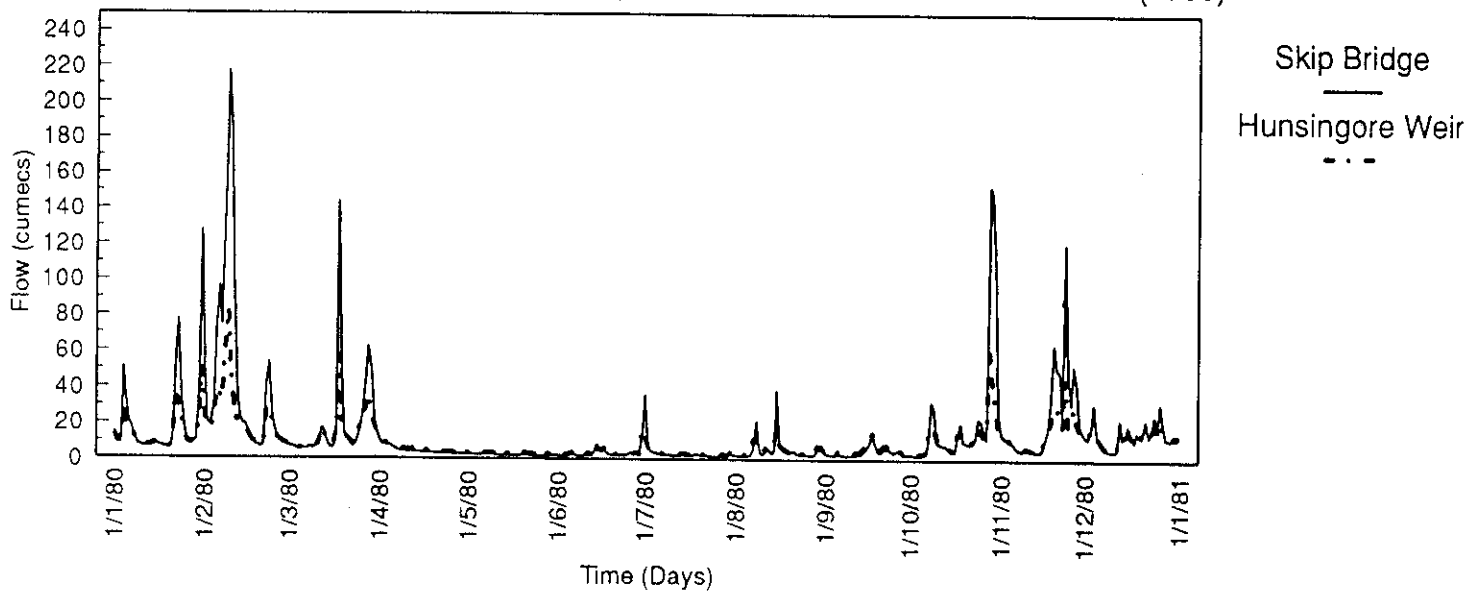
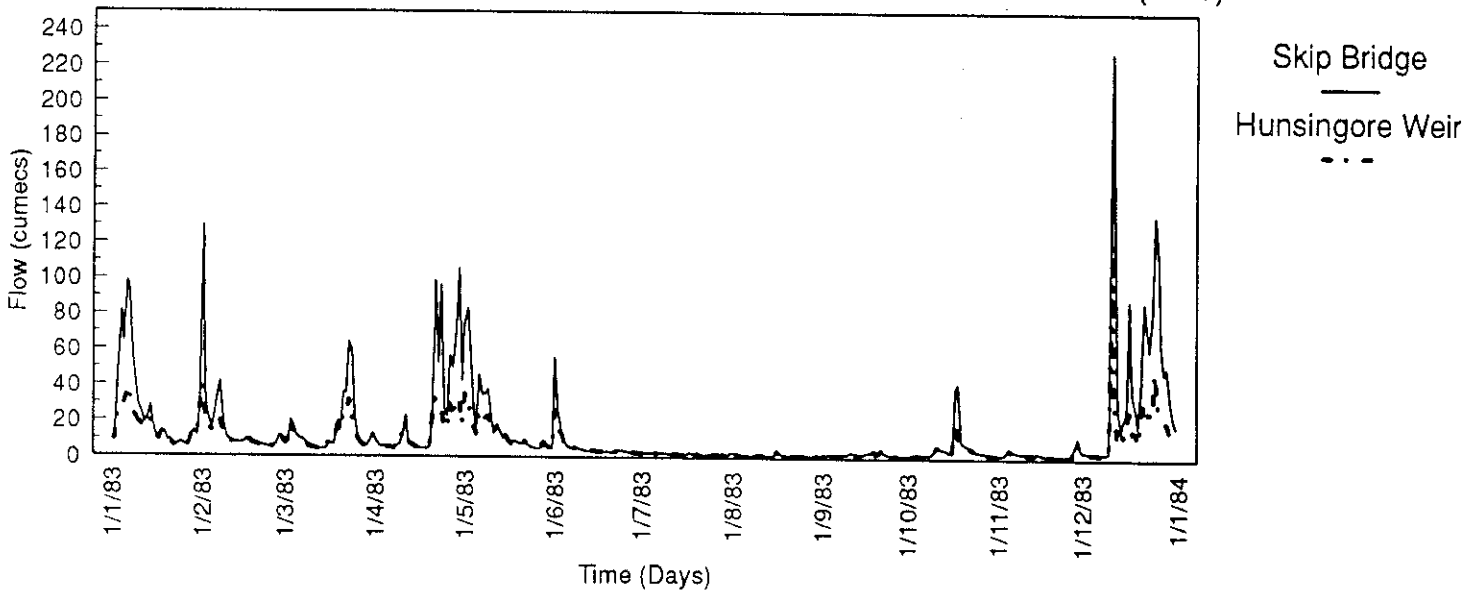


Figure 12. Flows for the downstream stations on the River Nidd (1983)



However, adding in the contribution due to the River Kyle leads to totals of 112% and 130% respectively, of that at York. The flow from the Kyle, as indicated in the station files, is very inaccurate and subject to backing up from the Ouse. This station should not be used.

3 Conclusions

Generally flow is well monitored down the main rivers from the upstream gauging points, with cumulative flows increasing on progressing down the river network. However there are large ungauged areas for all the rivers concerned.

Table 3 shows the total gauged area of each main river as given by the uppermost upstream station and all gauged tributaries. The catchment areas for the furthest downstream stations on the main rivers are also shown, and may be used as an indication of the total catchment area for that river system. Comparing these two areas gives an estimate of the total area of the ungauged area in each catchment, which is expressed as a percentage of the total downstream gauged area. It is evident that there are significant ungauged areas for all the main rivers; especially so for the Nidd which has only 22% of the total area gauged.

Table 3: Gauged and ungauged areas in the Ouse catchment

River	Total gauged area (km^2)	Downstream gauged area (km^2)	Ungauged area (%)
Swale	781.8	1363.0	43
Nidd	113.7	516.0	78
Ure	597.7	914.6	35
Ouse	2961.2	3315.0	11

There are significant problems with the gauging stations at Hunsingore Weir and Skip Bridge on the River Nidd and the station on the River Kyle. It is suggested that Hunsingore be used for high flows (above 20 cumecs) and Skip Bridge at low flows, but as a first step Hunsingore can be taken to provide reasonably reliable flows. The Kyle station gives a gross overestimate of the flow (up to 300%) from the tributary and should not be used in any modelling effort. Other stations, as indicated in Section 2, should be used with caution.

A river flow model such as QUASAR employing only flow inputs from Richmond (with an average value over the two years analysed for the daily mean annual flow of 9.60 cumecs), the River Wiske (3.58 cumecs) and Bedale Beck (2.29 cumecs) to describe the River Swale flow conditions would underestimate the flows out of the Swale (21.92 cumecs) by 30%. Similarly using only Gouthwaite (2.75 cumecs) as a flow input to the Nidd will cause an underestimate of the final flow out of the Nidd (14.43 cumecs) of 70%. Using the input flows of Kilgram Bridge (16.37 cumecs) and the River Laver (1.06 cumecs) for the Ure would cause

an underestimate of 20% in the actual flows out of the Ure (21.88 cumecs). The combination of inputs mentioned here leads to a total of 35.65 cumecs into the Ouse system which has to be compared with the average measured total of 54.32 cumecs at Skelton. Neglecting any contribution from the River Kyle (11.72 cumecs), the modelled flow at Skelton would therefore underestimate the actual flow by 35%.

In applying the QUASAR model to the Ouse system it is important to achieve accurate flow conditions. Using the input flow data available from the gauged stations alone and modelling down the Swale from Richmond, down the Ure from Kilgram bridge and down the Nidd from Gouthwaite reservoir it is obvious that a good fit to the actual flow totals would not be achieved. A means of estimating flow data from the various ungauged tributaries of the catchment is thus required in order to preserve the water balance.

The Institute of Hydrology Micro Low Flow system (Gustard et al., 1992) provides values for mean annual flows for ungauged tributaries using known catchment characteristics and mean annual rainfalls. These ungauged annual flows can be linked to gauged catchment flows. Using a transfomation factor daily gauged flows can be converted to flows appropriate for the ungauged catchment. This would provide a quick and ready estimate of inflows prior to full sub-catchment modelling.

Several gauging stations also have incomplete flow records, with years of data missing, e.g. the Swale at Richmond. In this case, it is again necessary to construct flow data and a quick and effective means of doing this is using the rainfall-runoff model IHACRES (Jakeman et al., 1990).

References

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APPENDIX 1: Monthly Gauged Discharge Summary of the Ouse Stations

UK NATIONAL RIVER FLOW ARCHIVE

RETRIEVAL OPTION 4 - MONTHLY MEAN GAUGED DISCHARGES IN CUBIC METRES PER SECOND

027001 Nidd at Hunsingore Weir

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1973	6.665	7.741	5.544	6.291	5.332	2.976	6.209	4.088	5.239	8.012	6.521	9.245	6.152
1974	21.440	16.920	9.961	4.038	2.542	2.450	3.150	3.036	8.118	8.077	14.020	17.080	9.195
1975	16.190	7.966	6.459	5.077	4.522	2.685	2.973	2.349	3.044	4.312	3.595	5.840	5.416
1976	11.520	7.299	4.734	4.279	6.030	3.204	1.915	1.405	7.377	22.730	7.997	12.990	7.646
1977	18.140	29.390	13.120	8.292	9.840	4.729	2.683	2.573	2.433	3.907	14.520	14.800	10.240
1978	17.390	16.370	12.500	7.009	6.564	3.001	2.656	3.195	4.520	2.692	6.739	28.230	9.223
1979	13.470	12.810	28.870	13.850	10.580	5.871	2.983	5.457	3.638	5.703	14.820	29.120	12.290
1980	14.360	23.090	14.230	5.306	3.213	4.167	3.772	5.971	5.902	14.240	15.210	13.520	10.210
1981	15.520	12.770	29.020	9.821	6.211	6.469	4.463	3.079	3.896	13.090	11.070	7.412	10.240
1982	17.680	5.039	13.810	2.834	2.164	7.819	2.257	-	2.298	5.372	17.630	17.790	-
1983	15.780	11.160	11.110	13.550	13.330	5.674	2.356	1.913	2.386	4.651	3.150	19.380	8.711
1984	20.530	17.760	4.723	1.177	0.206	-	-	-	-	-	-	-	-
1985	-	-	-	11.460	6.325	3.032	2.864	8.728	6.461	5.560	7.590	13.260	-
1986	19.330	7.633	11.900	21.240	8.737	3.300	2.031	4.620	2.808	3.953	14.060	20.640	10.040
1987	10.450	6.430	8.912	11.680	2.656	3.526	2.763	3.137	4.695	10.960	10.560	7.687	6.952
1988	22.970	22.020	8.428	4.036	3.481	2.203	4.627	7.620	5.897	12.520	6.682	11.800	9.337
1989	5.063	9.091	15.220	11.840	2.974	2.580	2.660	1.723	1.583	2.405	3.976	10.390	5.773
1990	19.520	25.590	8.961	2.526	1.750	1.930	1.785	1.387	1.257	3.036	5.086	15.310	7.246
1991	17.210	17.180	15.440	6.911	2.461	2.590	1.890	1.437	1.334	1.745	10.950	8.855	7.274
1992	9.260	5.499	9.652	9.096	3.495	2.074	1.980	2.182	4.774	6.077	13.190	18.550	7.160
Mean	15.390	13.790	12.240	8.016	5.121	3.699	2.948	3.550	4.087	7.318	9.861	14.840	8.386
Min	5.063	5.039	4.723	1.177	0.206	1.930	1.785	1.387	1.257	1.745	3.150	5.840	5.416
	1989	1982	1984	1984	1984	1990	1990	1990	1990	1991	1983	1975	1975
Max	22.970	29.390	29.020	21.240	13.330	7.819	6.209	8.728	8.118	22.730	17.630	29.120	12.290
	1988	1977	1981	1986	1983	1982	1973	1985	1974	1976	1982	1979	1979

The summary relates exclusively to the years shown. The yearly mean discharge makes allowance for incomplete years.

Period requested : 1973 - 1992

Gauged flow data available : Feb 1935 - Dec 1992

Station and Catchment Description

027001 Catchment area : 484.3 sq km

Grid reference : 4428 4530

Broad-crested weir, breadth 49.8 m. Rated by formulae, subsequently by C/M gaugings. Insensitive. Operation of by-pass sluice in the 1980s caused difficulties; flows subsequently revised. Low flows monitored d/s at Skip Bridge since 1979. Heavily reservoired headwaters (Angram, Scar House, Gouthwaite influence runoff, the latter especially significant during drought conditions). Net export of water.
Geology: Mainly Millstone Grit, Magnesian limestone and some marls. Predominantly rural, rugged in headwaters.

INSTITUTE OF HYDROLOGY (NATIONAL RIVER FLOW ARCHIVE SERVICE), WALLINGFORD, OXON OX10 8BB, UK TEL. 0491 838800. 6 MAY 1994

UK NATIONAL RIVER FLOW ARCHIVE

RETRIEVAL OPTION 4 - MONTHLY MEAN GAUGED DISCHARGES IN CUBIC METRES PER SECOND

027005 Nidd at Gouthwaite Reservoir

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1973	1.655	1.644	1.388	1.459	1.185	0.594	1.282	1.137	0.722	2.064	1.820	2.371	1.445
1974	6.387	3.583	2.010	0.662	0.482	0.311	0.565	0.662	3.328	3.336	3.703	5.686	2.557
1975	7.151	1.808	0.815	0.583	1.026	0.508	0.455	0.707	0.654	1.022	0.850	1.619	1.439
1976	3.156	1.576	0.906	1.202	1.185	0.527	0.444	0.542	0.815	8.536	2.089	2.684	1.983
1977	4.607	6.259	3.593	2.468	2.625	0.739	0.659	0.659	0.659	0.659	5.198	4.058	2.657
1978	4.662	4.111	3.729	1.419	0.936	0.659	0.659	0.659	0.659	0.659	1.826	6.699	2.219
1979	3.515	1.382	11.300	4.165	2.025	1.247	0.659	0.728	0.831	1.459	5.353	11.080	3.672
1980	3.389	7.502	3.149	1.191	0.659	0.659	0.659	0.894	1.644	4.852	6.505	5.399	3.024
1981	-	-	-	-	-	-	-	-	-	-	-	-	
1982	6.943	1.608	6.329	0.783	0.659	0.993	0.831	0.754	0.704	1.706	5.476	4.982	2.663
1983	-	-	2.988	2.237	4.002	1.869	0.737	0.659	0.659	1.317	1.079	5.345	
1984	9.876	6.778	1.226	0.890	0.659	0.659	0.659	0.410	0.602	1.470	6.119	3.005	2.661
1985	1.781	2.137	0.659	2.607	1.592	0.926	0.685	4.117	2.317	2.865	2.410	4.369	2.207
1986	6.536	1.394	3.074	6.759	2.856	0.926	0.668	1.154	0.769	0.959	4.739	6.455	3.034
1987	3.766	1.713	1.493	2.997	0.754	0.668	0.711	0.912	1.809	3.302	2.860	1.836	1.901
1988	8.171	7.309	1.885	0.926	0.849	0.659	0.676	1.908	1.605	4.141	2.111	3.833	2.831
1989	1.664	2.610	6.258	4.428	0.883	0.659	0.659	0.659	0.597	0.413	1.198	2.734	1.893
1990	6.420	10.110	3.207	0.628	0.428	0.428	0.428	0.376	0.347	0.529	2.224	4.863	2.454
1991	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	2.578	1.375	3.753	3.843	0.894	0.659	0.659	0.577	1.450	1.646	3.834	6.538	2.321
Mean	4.839	3.712	3.209	2.180	1.317	0.761	0.672	0.973	1.121	2.274	3.300	4.642	2.413
Min	1.655	1.375	0.659	0.583	0.428	0.311	0.428	0.376	0.347	0.413	0.850	1.619	1.439
	1973	1992	1985	1975	1990	1974	1990	1990	1990	1989	1975	1975	1975
Max	9.876	10.110	11.300	6.759	4.002	1.869	1.282	4.117	3.328	8.536	6.505	11.080	3.672
	1984	1990	1979	1986	1983	1983	1973	1985	1974	1976	1980	1979	1979

The summary relates exclusively to the years shown. The yearly mean discharge makes allowance for incomplete years.

Period requested : 1973 - 1992

Gauged flow data available : Oct 1936 - Dec 1992

Station and Catchment Description

027005 Catchment area : 113.7 sq km

Grid reference : 4141 4683

Rectangular notch 12.2 m wide set in broad-crested weir (total width 29 m). Measures overflow and compensation/regulation releases from Gouthwaite Reservoir.

UK NATIONAL RIVER FLOW ARCHIVE

RETRIEVAL OPTION 4 - MONTHLY MEAN GAUGED DISCHARGES IN CUBIC METRES PER SECOND

027007 Ure at Westwick Lock

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1973	18.360	16.310	12.470	17.500	10.710	4.996	14.770	13.810	8.673	13.970	15.830	22.660	14.180
1974	48.200	84.770	28.340	5.674	4.101	5.370	9.309	7.786	24.200	14.690	37.330	46.620	25.980
1975	45.870	17.180	10.250	9.912	8.506	3.024	7.273	5.884	12.360	11.620	10.990	12.390	12.950
1976	29.900	17.070	12.660	10.820	11.820	5.392	2.421	1.287	12.320	46.180	19.450	23.370	16.100
1977	34.450	46.100	30.050	22.390	17.550	9.164	6.092	5.361	8.941	16.890	36.910	29.790	21.800
1978	34.060	31.970	31.230	-	11.580	3.956	4.023	10.700	16.170	6.648	28.140	40.000	-
1979	25.020	19.900	60.330	29.240	18.970	9.986	3.640	15.170	11.320	-	36.730	56.330	-
1980	27.810	41.090	25.850	9.771	3.831	11.630	9.025	18.720	14.870	29.060	34.530	37.740	21.940
1981	30.340	20.540	57.100	16.020	14.580	14.200	4.859	3.869	17.540	36.070	29.990	13.310	21.570
1982	59.590	18.510	39.370	6.006	6.467	16.240	5.180	13.380	11.230	17.300	49.690	45.740	24.140
1983	46.870	22.470	28.360	26.710	29.500	12.960	3.937	2.646	8.077	26.430	10.190	42.840	21.820
1984	48.540	48.510	20.510	8.017	3.906	5.960	2.202	2.827	13.850	26.340	46.370	24.490	20.840
1985	20.570	14.830	13.260	29.070	13.620	7.611	12.150	31.220	24.080	13.560	14.690	39.980	19.600
1986	48.440	12.650	38.590	40.200	25.320	8.045	3.186	16.140	5.646	16.350	44.570	56.360	26.420
1987	24.790	17.140	26.340	25.370	5.317	14.710	11.760	9.141	16.030	34.650	27.830	25.710	19.910
1988	51.740	53.280	24.390	8.479	9.213	3.684	20.130	18.670	19.010	31.750	16.580	36.080	24.400
1989	16.500	34.460	45.430	29.030	5.098	4.012	3.408	4.074	2.886	13.760	13.970	27.020	16.540
1990	51.440	76.330	23.460	7.452	4.760	3.049	6.966	2.305	3.338	18.350	17.420	41.660	21.070
1991	46.090	52.260	37.460	20.660	4.921	8.895	4.685	3.527	4.661	12.380	43.950	26.560	21.950
1992	19.340	19.770	29.420	24.380	10.790	3.677	4.545	10.800	18.600	13.060	35.550	47.140	19.750
Mean	36.400	33.280	29.740	18.250	11.030	7.828	6.978	9.866	12.690	21.000	28.530	34.790	20.820
Min	16.500	12.650	10.250	5.674	3.831	3.024	2.202	1.287	2.886	6.648	10.190	12.390	12.950
	1989	1986	1975	1974	1980	1975	1984	1976	1989	1978	1983	1975	1975
Max	59.590	84.770	60.330	40.200	29.500	16.240	20.130	31.220	24.200	46.180	49.690	56.360	26.420
	1982	1974	1979	1986	1983	1982	1988	1985	1974	1976	1982	1986	1986

The summary relates exclusively to the years shown. The yearly mean discharge makes allowance for incomplete years.

Period requested : 1973 - 1992

Gauged flow data available : Oct 1958 - Dec 1992

Station and Catchment Description

027007 Catchment area : 914.6 sq km

Grid reference : 4356 4671

Broad-crested masonry weir, 59m wide, rated by current meter from a cableway 0.26km d/s (replaced an earlier rated section a short distance d/s - Boroughbridge weir was thought to act as partial control). Nov.1975-Dec.1982 data awaits reprocessing; expected to increase flows. Reservoirs have significant effect on the Burn and Laver but moderate overall impact; some net export of water.
Mixed geology of limestone and grits. Large, predominantly rural catchment draining from the Pennines.

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UK NATIONAL RIVER FLOW ARCHIVE

RETRIEVAL OPTION 4 - MONTHLY MEAN GAUGED DISCHARGES IN CUBIC METRES PER SECOND

027008 Swale at Leckby Grange

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1973	13.110	11.370	7.466	15.930	10.290	5.010	13.930	11.460	7.647	11.850	11.080	18.850	11.520
1974	40.900	33.180	24.880	8.348	6.451	5.617	8.038	7.169	14.830	17.480	29.380	36.850	19.370
1975	35.770	18.140	12.280	13.080	11.460	4.631	6.898	4.848	9.978	-	7.995	12.240	-
1976	24.900	16.340	10.250	9.500	12.430	11.000	-	-	-	53.710	18.050	26.320	-
1977	45.370	53.830	30.360	19.580	17.640	14.880	5.978	-	6.302	12.760	28.050	26.850	-
1978	35.400	45.670	26.710	13.310	15.090	6.095	5.948	13.420	11.500	7.471	22.090	50.380	20.980
1979	31.560	24.050	71.680	38.360	27.330	12.740	-	12.350	13.160	12.020	37.400	62.830	-
1980	36.270	50.370	33.280	13.460	8.335	15.460	14.920	20.000	14.010	31.780	31.540	37.260	25.500
1981	27.480	20.010	63.270	22.200	15.400	12.990	-	-	-	37.210	26.920	19.730	-
1982	58.580	17.530	32.750	7.932	9.515	-	-	-	-	17.480	46.780	43.800	-
1983	35.630	25.820	26.070	37.750	35.110	19.110	-	-	-	-	-	40.590	-
1984	46.720	47.480	26.470	-	-	-	-	-	-	-	48.610	22.330	-
Mean	35.980	30.380	30.450	18.130	15.370	10.750	9.285	11.540	11.060	22.420	27.990	33.170	21.360
Min	13.110	11.370	7.466	7.932	6.451	4.631	5.948	4.848	6.302	7.471	7.995	12.240	11.520
	1973	1973	1973	1982	1974	1975	1978	1975	1977	1978	1975	1975	1973
Max	58.580	53.830	71.680	38.360	35.110	19.110	14.920	20.000	14.830	53.710	48.610	62.830	25.500
	1982	1977	1979	1979	1983	1983	1980	1980	1974	1976	1984	1979	1980

The summary relates exclusively to the years shown. The yearly mean discharge makes allowance for incomplete years.

Period requested : 1973 - 1992

Gauged flow data available : Nov 1955 - Dec 1984

Station and Catchment Description

027008 Catchment area : 1345.6 sq km

Grid reference : 4415 4749

Velocity-area station, channel 22 metres wide at low flows. No single effective control - heavy summer weedgrowth. Station superseded by Crakehill (27071) in 1980 (but cableway still used for high flow calibration).
Rural catchment draining the northern Yorkshire Dales. Geology comprises mainly limestones, sandstones and shales with a covering of Boulder Clay.

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6 MAY 1994

UK NATIONAL RIVER FLOW ARCHIVE

RETRIEVAL OPTION 4 - MONTHLY MEAN GAUGED DISCHARGES IN CUBIC METRES PER SECOND

027009 Ouse at Skelton

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1973	39.060	35.980	24.570	41.760	25.730	12.210	33.840	26.520	19.760	32.650	31.440	48.960	31.050
1974	117.800	92.380	55.710	16.410	-	10.830	16.630	15.870	44.210	41.120	84.650	107.500	-
1975	98.010	45.440	26.940	26.840	19.570	9.349	16.450	12.910	24.500	24.180	21.950	32.510	29.860
1976	73.590	43.470	28.220	24.650	28.310	16.270	7.389	5.322	38.640	140.700	53.800	79.050	45.090
1977	117.000	152.400	81.930	57.350	51.020	31.880	15.870	13.540	16.820	35.730	88.340	80.360	61.260
1978	101.300	111.300	84.460	34.890	34.520	9.413	10.570	27.380	32.950	16.080	59.270	121.400	53.370
1979	92.330	68.360	170.200	94.940	63.430	31.720	10.070	33.420	-	24.650	91.980	164.500	-
1980	92.570	133.200	83.370	29.650	10.100	26.560	27.320	44.520	31.510	79.480	87.310	92.640	61.320
1981	76.320	58.180	165.000	53.910	38.450	31.970	11.280	-	37.490	90.300	67.360	35.510	-
1982	141.300	38.940	84.170	18.420	15.790	40.910	13.950	19.280	18.290	30.970	106.800	103.500	52.880
1983	88.980	51.000	57.230	68.240	70.860	27.740	10.850	7.822	15.720	43.490	20.500	103.900	47.320
1984	117.400	120.200	49.140	20.680	12.700	14.770	6.448	8.701	23.520	45.190	113.400	52.140	48.360
1985	57.730	36.570	29.790	70.780	33.130	16.330	21.820	57.210	40.560	25.370	34.890	86.700	42.640
1986	107.300	33.340	75.440	111.900	56.620	17.940	6.386	34.400	12.550	25.000	80.240	114.700	56.510
1987	61.720	39.450	66.860	70.160	14.380	30.570	25.530	20.610	30.020	84.340	68.400	56.960	47.460
1988	129.400	129.900	60.990	23.650	21.360	8.172	44.560	40.770	37.100	68.930	33.440	83.300	56.740
1989	36.300	64.060	89.780	62.030	12.480	9.592	8.478	7.562	5.960	24.310	30.180	60.260	34.080
1990	111.700	174.000	58.620	17.690	10.760	8.594	13.660	6.659	8.467	35.240	37.680	98.100	47.730
1991	118.700	119.900	110.000	47.170	13.840	21.220	10.420	7.278	8.671	18.370	81.890	54.100	50.520
1992	44.480	36.990	49.150	60.750	21.810	9.413	11.150	18.860	34.010	30.630	71.280	118.000	42.220
Mean	91.140	79.370	72.580	47.590	29.200	19.270	16.130	21.510	25.300	45.840	63.240	84.710	49.550
Min	36.300	33.340	24.570	16.410	10.100	8.172	6.386	5.322	5.960	16.080	20.500	32.510	29.860
	1989	1986	1973	1974	1980	1988	1986	1976	1989	1978	1983	1975	1975
Max	141.300	174.000	170.200	111.900	70.860	40.910	44.560	57.210	44.210	140.700	113.400	164.500	61.320
	1982	1990	1979	1986	1983	1982	1988	1985	1974	1976	1984	1979	1980

The summary relates exclusively to the years shown. The yearly mean discharge makes allowance for incomplete years.

Period requested : 1973 - 1992

Gauged flow data available : Oct 1969 - Dec 1992

Station and Catchment Description

027009 Catchment area : 3315.0 sq km

Grid reference : 4568 4554

Velocity-area station with control exercised mainly by Naburn weir - but since 1982 a rating independent of sluice-gate settings has been employed. Pre-1982 records are less reliable and will be reprocessed. PWS abstraction u/s - increasing impact on very low flows; some artificial GW augmentation now a counterbalancing influence. New US station commissioned 1992. Mixed geology. Predominantly rural catchment draining the northern parts of the Vale of York and the Yorkshire Dales.

INSTITUTE OF HYDROLOGY (NATIONAL RIVER FLOW ARCHIVE SERVICE), WALLINGFORD, OXON OX10 8BB, UK TEL. 0491 838800.

6 MAY 1994

UK NATIONAL RIVER FLOW ARCHIVE

RETRIEVAL OPTION 4 - MONTHLY MEAN GAUGED DISCHARGES IN CUBIC METRES PER SECOND

027024 Swale at Richmond

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1973	8.317	6.900	4.667	10.640	6.275	2.646	7.764	7.535	3.642	6.292	6.698	10.410	6.825
1974	20.500	15.590	11.110	2.824	1.912	1.635	3.999	3.405	11.340	8.782	19.120	25.000	10.410
1975	23.300	7.052	4.730	5.811	5.718	1.245	3.148	2.741	7.338	5.521	5.115	6.822	6.559
1976	13.810	9.639	6.066	4.948	4.996	2.211	0.634	-	-	26.430	8.722	7.929	-
1977	17.770	21.120	13.940	9.853	6.598	5.580	2.411	2.065	4.261	9.531	20.640	15.050	10.660
1978	13.800	16.570	16.010	5.827	4.926	0.936	1.329	6.316	6.894	3.512	16.160	22.770	9.553
1979	10.960	7.849	35.770	17.580	8.101	2.860	0.522	5.664	4.197	5.562	18.960	26.360	12.080
1980	11.130	17.800	10.940	3.140	0.450	-	3.333	7.405	5.827	16.690	17.870	20.530	-
Mean	14.950	12.820	12.900	7.578	4.872	2.445	2.892	5.019	6.214	10.290	14.160	16.860	9.242
Min	8.317	6.900	4.667	2.824	0.450	0.936	0.522	2.065	3.642	3.512	5.115	6.822	6.559
	1973	1973	1973	1974	1980	1978	1979	1977	1973	1978	1975	1975	1975
Max	23.300	21.120	35.770	17.580	8.101	5.580	7.764	7.535	11.340	26.430	20.640	26.360	12.080
	1975	1977	1979	1979	1979	1977	1973	1973	1974	1976	1977	1979	1979

The summary relates exclusively to the years shown. The yearly mean discharge makes allowance for incomplete years.

Period requested : 1973 - 1992

Gauged flow data available : Oct 1961 - Dec 1980

Station and Catchment Description

027024 Catchment area : 381.0 sq km

Grid reference : 4146 5006

Velocity-area station. Discontinued 1980

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6 MAY 1994

UK NATIONAL RIVER FLOW ARCHIVE

RETRIEVAL OPTION 4 - MONTHLY MEAN GAUGED DISCHARGES IN CUBIC METRES PER SECOND

027034 Ure at Kilgram Bridge

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1973	13.890	12.800	9.477	14.440	8.218	3.338	11.640	11.030	6.153	10.460	13.380	17.390	11.020
1974	37.740	26.320	15.210	2.884	2.122	3.848	7.951	6.172	21.540	12.190	33.160	39.370	17.330
1975	37.930	11.030	6.572	7.320	6.397	1.626	6.111	5.109	11.770	10.240	9.739	11.070	10.430
1976	26.760	13.670	10.560	8.440	9.258	3.443	1.394	0.560	9.767	37.460	14.770	14.310	12.560
1977	25.090	32.000	21.370	17.350	10.840	5.557	3.985	3.867	8.149	15.020	33.520	24.730	16.670
1978	24.860	22.130	24.420	7.627	6.294	1.547	1.970	8.319	14.410	5.004	27.390	29.790	14.440
1979	17.800	12.670	49.620	19.830	12.610	5.275	1.351	12.150	9.310	8.477	32.400	45.780	19.020
1980	19.320	29.080	16.510	4.732	1.122	8.684	5.696	14.950	12.490	27.160	30.740	32.720	16.900
1981	22.830	14.920	48.370	9.503	9.759	10.720	2.827	1.979	16.280	31.780	26.160	8.511	17.000
1982	38.380	13.390	27.410	2.868	4.393	10.560	2.572	10.720	8.875	13.680	37.300	33.860	17.050
1983	36.820	14.040	21.050	16.990	18.720	7.982	1.819	0.939	6.651	23.360	8.397	32.420	15.840
1984	32.800	32.800	13.570	4.494	1.680	4.021	0.592	1.455	12.500	22.940	36.060	18.630	15.040
1985	13.550	9.189	9.621	20.050	8.692	5.153	9.924	27.050	22.350	10.420	10.770	30.890	14.850
1986	35.750	6.565	29.790	24.560	17.150	5.198	1.238	13.510	3.848	14.180	36.300	44.040	19.470
1987	16.880	13.040	20.180	15.210	2.930	11.970	9.862	6.867	13.570	27.660	20.380	20.460	14.930
1988	36.730	36.790	18.060	5.807	6.517	1.720	16.880	15.330	15.640	23.560	12.010	27.250	18.020
1989	13.240	27.750	34.730	19.590	2.634	2.275	1.562	3.202	1.742	12.060	11.730	21.120	12.550
1990	40.660	56.690	15.690	5.228	3.126	1.496	5.355	1.111	2.608	16.440	15.200	34.080	16.260
1991	34.070	34.320	25.240	15.090	2.252	6.456	2.905	1.951	3.348	11.700	36.900	21.850	16.200
1992	13.730	15.660	22.930	17.030	7.686	1.797	2.836	8.730	14.450	9.140	27.350	32.760	14.500
Mean	26.940	21.780	22.020	11.950	7.120	5.133	4.923	7.750	10.770	17.150	23.680	27.050	15.500
Min	13.240	6.565	6.572	2.868	1.122	1.496	0.592	0.560	1.742	5.004	8.397	8.511	10.430
	1989	1986	1975	1982	1980	1990	1984	1976	1989	1978	1983	1981	1975
Max	40.660	56.690	49.620	24.560	18.720	11.970	16.880	27.050	22.350	37.460	37.300	45.780	19.470
	1990	1990	1979	1986	1983	1987	1988	1985	1985	1976	1982	1979	1986

The summary relates exclusively to the years shown.

Period requested : 1973 - 1992

Gauged flow data available : Oct 1967 - Dec 1992

Station and Catchment Description

027034 Catchment area : 510.2 sq km

Grid reference : 4190 486

Velocity-area station rated by current meter. Low flow control is exercised by the sill of Kilgram Bridge 70m d/s. Flows < 1 cumec underestimated, recalibration scheduled. Some floodplain storage. Largely natural regime; minor export of water - Thorton Steward abstraction (operational from 1977) is just upstream.
Geology is mainly Carboniferous Limestone and Millstone Grit. Rural catchment draining from the Pennines.

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UK NATIONAL RIVER FLOW ARCHIVE

RETRIEVAL OPTION 4 - MONTHLY MEAN GAUGED DISCHARGES IN CUBIC METRES PER SECOND

027047 Snaizeholme Beck at Low Houses

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1972	-	-	-	-	-	-	-	0.263	0.049	0.152	1.074	0.872	-
1973	0.561	0.500	0.428	0.465	0.301	0.128	0.423	0.460	0.270	0.417	0.541	0.759	0.438
1974	1.136	0.804	0.495	0.047	0.041	0.205	0.497	0.263	0.995	0.400	1.123	1.467	0.622
1975	1.276	0.342	0.224	0.399	0.177	0.057	0.441	0.279	0.697	0.410	0.578	0.429	0.443
1976	0.960	0.475	0.429	0.335	0.430	0.098	0.099	0.029	0.327	0.920	0.611	0.376	0.425
1977	0.745	1.039	0.658	0.636	0.342	0.170	0.220	0.295	0.563	0.784	1.167	0.779	0.613
1978	0.759	0.660	0.974	0.153	0.116	0.038	0.104	0.524	0.768	0.220	1.244	0.802	0.529
1979	-	0.364	1.363	0.537	0.554	0.137	0.084	0.719	0.586	0.438	1.289	1.483	-
1980	0.596	0.895	0.565	0.122	0.024	0.377	0.210	0.717	0.665	1.124	1.101	1.341	0.644
1981	0.828	0.422	1.689	0.243	0.324	0.494	0.205	0.090	0.866	1.052	-	-	-
1982	1.028	0.641	0.903	0.070	0.207	0.377	0.062	0.608	0.472	0.566	1.135	1.154	0.603
1983	1.472	-	0.827	0.478	0.416	0.199	0.045	0.035	0.422	1.020	0.421	1.151	-
1984	0.995	0.862	0.355	0.089	0.032	0.187	0.021	0.101	0.728	1.021	1.140	0.752	0.522
1985	0.443	0.222	0.386	0.700	0.232	0.226	-	-	-	-	0.432	1.152	-
1986	1.151	-	-	0.524	0.724	0.212	0.052	0.440	0.076	0.811	1.365	1.611	-
1987	-	-	0.760	0.330	0.069	0.510	0.347	0.240	0.625	0.987	0.682	0.899	-
1988	1.145	1.019	0.674	0.157	0.192	0.029	0.798	0.738	0.668	0.682	0.389	0.938	0.620
1989	0.516	1.162	1.281	0.491	0.031	0.140	0.039	0.247	0.092	0.725	0.451	0.657	0.483
1990	1.498	1.774	0.405	0.236	0.163	0.071	0.288	0.082	0.186	0.829	0.596	1.065	0.593
1991	0.838	1.121	0.726	0.520	0.025	0.313	0.153	0.104	0.208	0.603	1.186	0.803	0.545
1992	0.428	0.651	0.909	0.573	0.260	0.025	0.118	0.565	0.641	0.383	1.113	0.957	0.551
Mean	0.910	0.762	0.740	0.355	0.233	0.200	0.221	0.340	0.495	0.677	0.882	0.972	0.565
Min	0.428	0.222	0.224	0.047	0.024	0.025	0.021	0.029	0.049	0.152	0.389	0.376	0.425
	1992	1985	1975	1974	1980	1992	1984	1976	1972	1972	1988	1976	1976
Max	1.498	1.774	1.689	0.700	0.724	0.510	0.798	0.738	0.995	1.124	1.365	1.611	0.644
	1990	1990	1981	1985	1986	1987	1988	1988	1974	1980	1986	1986	1980

The summary relates exclusively to the years shown. The yearly mean discharge makes allowance for incomplete years.

Period requested : Record up to 1992

Gauged flow data available : Aug 1972 - Dec 1992

Station and Catchment Description

027047 Catchment area : 10.2 sq km

Grid reference : 3833 4883

Flat V weir installed in 1985 superseded a limited capacity, wooden trapezoidal flume. Bypassing now less common; pre-1985 it was a feature of several floods each year. Structurefull now 0.95 metres. Flashy, natural regime but possibility of minor amount of spring water deriving from outside the topographical catchment.
Wet, steep catchment in the Pennines developed mainly on Carboniferous Limestone; some Millstone Grit on the south-eastern boundary. Land use is mostly rough grazing.

UK NATIONAL RIVER FLOW ARCHIVE

RETRIEVAL OPTION 4 - MONTHLY MEAN GAUGED DISCHARGES IN CUBIC METRES PER SECOND

027053 Nidd at Birstwith

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1975	-	-	-	1.890	2.182	1.015	1.267	1.310	1.682	2.579	1.893	3.612	-
1976	7.437	3.866	2.497	2.326	3.381	1.648	0.912	0.886	3.920	15.120	4.595	-	-
1977	9.946	14.520	6.748	4.393	5.083	1.742	1.197	1.204	1.263	2.279	10.590	9.630	5.657
1978	10.230	8.751	7.084	3.322	2.409	1.237	1.134	1.480	2.606	1.508	4.344	14.990	4.915
1979	7.291	4.297	21.140	7.247	4.269	2.397	1.236	2.493	1.734	3.114	9.753	20.280	7.148
1980	6.927	13.540	6.499	2.097	1.135	1.661	1.451	2.393	2.851	8.695	10.000	8.080	5.414
1981	8.539	6.277	19.100	3.948	2.892	2.979	1.301	1.237	2.048	8.488	7.267	4.079	5.693
1982	12.810	3.215	10.190	1.704	1.196	3.131	1.556	1.791	1.357	3.522	12.000	12.760	5.464
1983	11.890	6.176	6.603	6.024	7.061	2.999	1.178	0.912	1.412	3.533	2.152	14.790	5.412
1984	15.960	16.010	3.319	1.681	1.064	1.017	0.815	0.655	1.407	3.858	12.830	5.347	5.283
1985	4.433	3.650	1.916	6.059	3.002	1.639	1.400	5.690	3.955	3.495	4.595	8.421	4.024
1986	13.340	3.068	7.745	12.770	3.990	1.736	1.023	2.571	1.451	2.675	9.115	14.210	6.165
1987	6.464	3.381	4.494	5.555	1.356	1.646	1.367	1.669	3.013	6.118	5.953	4.278	3.775
1988	16.110	15.800	4.499	2.035	1.860	1.041	2.164	4.385	3.670	8.349	3.862	7.405	5.914
1989	3.073	5.779	11.950	7.268	1.670	1.169	1.121	0.824	0.791	1.311	2.482	6.373	3.642
1990	14.140	18.220	5.849	1.363	0.837	0.771	0.808	0.531	0.546	1.800	3.699	10.360	4.837
1991	11.630	12.980	9.211	4.043	1.067	1.168	0.832	0.645	0.523	0.743	7.431	5.821	4.622
1992	5.529	2.933	6.464	5.397	1.899	0.966	0.883	0.978	2.546	2.927	7.278	12.120	4.168
Mean	9.750	8.402	7.960	4.396	2.575	1.665	1.202	1.759	2.043	4.451	6.657	9.562	5.025
Min	3.073	2.933	1.916	1.363	0.837	0.771	0.808	0.531	0.523	0.743	1.893	3.612	3.642
	1989	1992	1985	1990	1990	1990	1990	1990	1991	1991	1975	1975	1989
Max	16.110	18.220	21.140	12.770	7.061	3.131	2.164	5.690	3.955	15.120	12.830	20.280	7.148
	1988	1990	1979	1986	1983	1982	1988	1985	1985	1976	1984	1979	1979

The summary relates exclusively to the years shown. The yearly mean discharge makes allowance for incomplete years.

Period requested : Record up to 1992

Gauged flow data available : Apr 1975 - Dec 1992

Station and Catchment Description

027053 Catchment area : 217.6 sq km

Grid reference : 4230 4603

Velocity-area station approximately 17m wide, rated by current metering (to 30 cumecs only) from bridge at the section. Riffle control, may be subject to erosion. Heavily reservoired catchment with substantial effect on flows. Geology is mostly Millstone Grit. Rural catchment.

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UK NATIONAL RIVER FLOW ARCHIVE

RETRIEVAL OPTION 4 - MONTHLY MEAN GAUGED DISCHARGES IN CUBIC METRES PER SECOND

027059 Laver at Ripon

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1977	-	-	-	-	-	-	-	-	-	-	1.003	1.526	-
1978	2.540	2.289	1.332	0.908	0.925	0.283	0.188	0.289	0.391	0.167	0.442	3.786	1.126
1979	1.713	1.962	3.850	1.520	1.233	-	0.230	0.506	0.253	0.579	1.930	3.637	-
1980	1.854	-	1.886	0.626	0.322	0.694	0.480	0.841	0.282	1.104	1.422	1.431	-
1981	1.519	1.457	3.626	1.294	0.729	0.488	0.210	0.225	0.462	1.506	0.959	0.848	1.111
1982	2.863	0.659	2.006	0.453	0.272	1.264	0.312	0.256	0.229	0.603	2.400	2.293	1.139
1983	1.869	1.547	1.254	1.843	1.881	0.839	0.255	0.157	0.246	0.552	0.419	2.611	1.122
1984	3.265	3.090	1.259	0.543	0.320	0.247	0.098	0.096	0.239	0.600	2.274	0.902	1.070
1985	1.376	0.684	0.721	1.574	0.872	0.315	0.282	0.952	0.344	0.432	0.784	1.684	0.837
1986	2.299	0.981	1.645	3.063	1.122	0.410	0.182	0.537	0.224	0.262	1.546	2.255	1.211
1987	1.136	0.775	1.272	1.775	0.343	0.545	0.275	0.455	0.618	1.587	1.487	1.013	0.940
1988	2.834	2.959	1.015	0.490	0.614	0.233	0.696	0.609	0.546	1.736	1.033	1.487	1.185
1989	0.471	1.217	1.616	1.824	0.438	0.241	0.233	0.105	0.073	0.187	0.324	1.331	0.668
1990	2.324	3.420	1.012	0.396	0.214	0.165	0.141	0.065	0.061	0.289	0.252	1.641	0.817
1991	2.134	2.042	2.142	0.800	0.307	0.247	0.125	0.072	0.069	0.147	0.925	0.758	0.807
1992	0.863	0.559	0.943	1.077	0.318	0.176	0.156	0.213	0.653	0.692	1.662	2.361	0.807
Mean	1.937	1.693	1.705	1.212	0.661	0.439	0.258	0.359	0.313	0.696	1.179	1.848	1.022
Min	0.471	0.559	0.721	0.396	0.214	0.165	0.098	0.065	0.061	0.147	0.252	0.758	0.668
	1989	1992	1985	1990	1990	1990	1984	1990	1990	1991	1990	1991	1989
Max	3.265	3.420	3.850	3.063	1.881	1.264	0.696	0.952	0.653	1.736	2.400	3.786	1.211
	1984	1990	1979	1986	1983	1982	1988	1985	1992	1988	1982	1978	1986

The summary relates exclusively to the years shown. The yearly mean discharge makes allowance for incomplete years.

Period requested : Record up to 1992

Gauged flow data available : Nov 1977 - Dec 1992

Station and Catchment Description

027059 Catchment area : 87.5 sq km

Grid reference : 4301 4710

Crump profile weir, 10m wide. Theoretical rating. Insensitive at low flows, but a notch in the stilling basin toe wall could be used for very low flow measurement. Small export of water.
Geology is mostly Millstone Grit and Magnesian Limestone. A predominantly rural catchment below moorland (Pennine) headwaters. There are some swallow holes in the lower part of the catchment.

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6 MAY 1994

UK NATIONAL RIVER FLOW ARCHIVE

RETRIEVAL OPTION 4 - MONTHLY MEAN GAUGED DISCHARGES IN CUBIC METRES PER SECOND

027060 Kyle at Newton On Ouse

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1979	-	-	-	-	11.620	2.831	0.233	1.913	0.940	0.512	15.570	56.650	-
1980	20.940	43.020	18.080	1.799	0.367	1.312	3.426	4.923	1.835	20.450	19.170	20.710	12.910
1981	13.290	8.780	59.920	9.985	1.998	1.337	0.254	0.472	6.264	21.040	11.950	6.512	11.890
1982	43.280	2.529	20.490	0.544	0.469	13.840	0.517	0.777	0.855	2.938	35.440	27.990	12.550
1983	22.250	9.534	11.360	21.730	16.780	4.504	0.245	0.178	0.207	5.490	1.199	32.170	10.520
1984	40.290	44.930	11.730	0.800	0.340	0.241	0.121	0.158	1.735	5.796	31.340	6.579	11.860
1985	13.940	6.688	3.049	18.370	3.696	0.506	1.612	8.346	4.603	1.732	3.975	19.960	7.214
1986	30.760	4.707	16.990	31.240	11.440	1.085	0.234	6.259	0.416	2.248	17.730	35.260	13.270
1987	15.170	5.767	15.020	18.800	0.485	2.535	2.600	1.287	2.856	25.790	14.880	12.060	9.804
1988	41.800	42.640	10.440	0.709	1.315	0.336	7.644	4.921	3.869	15.760	3.673	25.150	13.150
1989	2.139	11.020	16.770	10.960	0.315	0.195	0.181	0.126	0.113	1.153	2.010	12.690	4.771
1990	25.310	57.310	8.900	0.290	0.204	0.230	0.417	0.171	0.131	2.273	3.073	24.920	9.985
1991	31.150	35.930	30.860	5.903	0.295	0.314	0.161	0.110	0.144	0.372	16.170	10.260	10.830
1992	6.842	3.019	7.206	11.550	1.066	0.147	0.183	1.169	2.548	3.258	13.960	36.360	7.301
Mean	23.630	21.350	17.760	10.200	3.599	2.101	1.273	2.201	1.894	7.772	13.580	23.380	10.690
Min	2.139 1989	2.529 1982	3.049 1985	0.290 1990	0.204 1990	0.147 1992	0.121 1984	0.110 1991	0.113 1989	0.372 1991	1.199 1983	6.512 1981	4.771 1989
Max	43.280 1982	57.310 1990	59.920 1981	31.240 1986	16.780 1983	13.840 1982	7.644 1988	8.346 1985	6.264 1981	25.790 1987	35.440 1982	56.650 1979	13.270 1986

The summary relates exclusively to the years shown. The yearly mean discharge makes allowance for incomplete years.

Period requested : Record up to 1992

Gauged flow data available : May 1979 - Dec 1992

Station and Catchment Description

027060 Catchment area : 167.6 sq km

Grid reference : 4509 4602

Theoretically rated Flat V weir, 6m wide. Flow record very inaccurate above the low flow range: weir subject to drowning due to backing up from the Ouse - confluence is just d/s. High flows and runoff totals erroneous - substantial overestimation. Flat rural catchment draining part of the Vale of York. Triassic sandstones and marls.

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UK NATIONAL RIVER FLOW ARCHIVE

RETRIEVAL OPTION 4 - MONTHLY MEAN GAUGED DISCHARGES IN CUBIC METRES PER SECOND

027062 Nidd at Skip Bridge

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1979	-	-	-	-	12.730	5.076	2.289	4.437	2.767	4.739	19.830	65.260	-
1980	20.660	46.650	19.520	4.348	2.391	3.396	3.799	5.674	4.509	23.640	23.160	14.530	14.240
1981	18.740	18.410	68.580	-	-	-	-	-	5.220	27.810	13.980	9.814	-
1982	44.920	5.392	23.780	3.191	2.310	14.590	2.951	3.081	2.445	5.610	34.790	35.120	14.940
1983	26.400	17.120	14.550	25.780	19.670	6.964	2.312	1.915	2.538	6.410	3.528	47.810	14.620
1984	54.480	55.530	10.880	3.792	2.449	2.168	1.611	1.603	2.964	6.018	39.460	10.520	15.780
1985	17.250	8.278	4.755	20.410	8.567	2.944	3.002	11.110	6.112	5.564	10.050	22.180	10.030
1986	40.810	10.050	21.040	45.080	11.930	3.444	2.059	9.831	2.785	3.728	22.450	43.650	18.130
1987	17.650	7.190	13.410	21.420	2.726	3.512	2.705	3.100	4.599	21.290	15.090	10.290	10.260
1988	55.250	55.870	10.270	3.892	3.606	2.192	5.379	10.910	6.627	21.270	8.556	23.040	17.160
1989	5.100	12.270	26.440	19.440	3.019	2.761	2.840	1.715	1.557	2.296	3.812	20.420	8.459
1990	43.160	66.370	13.190	2.618	1.819	1.915	1.740	1.339	1.183	2.840	5.415	31.370	14.110
1991	40.770	41.220	32.880	8.510	2.414	2.534	1.803	1.364	1.282	1.605	15.930	18.170	13.890
1992	16.650	5.470	14.550	13.470	3.564	2.044	1.946	2.131	5.628	8.111	18.870	44.560	11.460
Mean	30.910	27.060	21.060	14.330	5.938	4.119	2.649	4.478	3.587	10.070	16.780	28.340	14.060
Min	5.100	5.392	4.755	2.618	1.819	1.915	1.611	1.339	1.183	1.605	3.528	9.814	8.459
	1989	1982	1985	1990	1990	1990	1984	1990	1990	1991	1983	1981	1989
Max	55.250	66.370	68.580	45.080	19.670	14.590	5.379	11.110	6.627	27.810	39.460	65.260	18.130
	1988	1990	1981	1986	1983	1982	1988	1985	1988	1981	1984	1979	1986

The summary relates exclusively to the years shown. The yearly mean discharge makes allowance for incomplete years.

Period requested : Record up to 1992

Gauged flow data available : May 1979 - Dec 1992

Station and Catchment Description

027062 Catchment area : 516.0 sq km

Grid reference : 4482 4561

Limited range Flat V weir, 17m wide. Subject to drowning and inaccurate at high flows - intended for use in conjunction with the gauge at Hunsingore (27001) which is insensitive at low flows. Heavily reservoired headwaters of the Nidd and Washburn valleys have a significant effect on flows. Gouthwaite Reservoir outflows especially significant in drought conditions. Geology: Carboniferous Millstone Grits, Permian Marls and Triassic sandstones. Predominantly rural, rugged in headwaters.

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6 MAY 1994

UK NATIONAL RIVER FLOW ARCHIVE

RETRIEVAL OPTION 4 - MONTHLY MEAN GAUGED DISCHARGES IN CUBIC METRES PER SECOND

027071 Swale at Crakehill

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1973	13.110	11.360	7.465	15.930	10.290	5.011	13.930	11.460	7.646	11.850	11.080	18.850	11.520
1974	40.900	33.180	24.880	8.345	6.448	5.616	8.035	7.170	14.830	17.480	29.380	36.850	19.370
1975	35.760	18.140	12.280	13.080	11.470	4.633	6.895	4.845	9.981	-	7.998	12.240	-
1976	24.900	16.340	10.250	9.497	12.430	11.000	3.695	1.959	15.670	53.710	18.050	26.310	17.030
1977	45.360	53.820	30.360	19.580	17.640	14.890	5.974	-	6.305	12.750	28.050	26.850	-
1978	35.400	45.660	26.710	13.310	15.090	6.095	5.949	13.420	11.510	7.470	22.090	50.380	20.970
1979	31.560	24.040	71.680	38.360	27.330	12.750	-	12.360	13.160	12.010	37.400	62.830	-
1980	36.270	50.380	33.290	13.460	8.101	12.490	12.230	16.200	10.860	27.960	28.200	33.840	23.540
1981	25.210	18.540	60.040	21.040	14.160	11.790	5.399	4.626	13.620	35.430	25.180	17.470	21.100
1982	56.800	16.470	30.480	7.819	6.468	15.240	6.381	8.615	8.482	16.180	42.760	40.580	21.430
1983	32.830	23.980	24.240	34.770	32.370	17.180	5.710	3.684	6.442	16.980	7.541	37.630	20.290
1984	42.800	44.450	24.310	11.170	5.557	6.121	2.712	4.081	9.465	16.110	44.280	20.750	19.200
1985	27.390	16.050	15.520	28.870	15.280	8.198	9.521	24.220	16.090	10.320	15.480	35.840	18.600
1986	41.320	17.690	32.270	46.690	25.390	9.344	4.188	16.660	7.215	9.089	30.500	41.050	23.500
1987	25.510	18.950	29.690	28.980	7.196	13.780	12.870	9.684	11.860	39.340	30.770	24.460	21.110
1988	46.230	46.530	25.530	9.960	10.610	4.727	19.160	12.810	12.760	26.100	18.230	32.520	22.080
1989	14.390	24.580	30.110	23.110	6.203	4.322	3.812	3.506	2.819	8.045	10.630	20.300	12.580
1990	36.930	59.830	17.810	7.120	4.585	3.960	5.186	2.636	3.003	12.110	11.830	37.520	16.640
1991	44.070	47.040	40.560	15.350	5.801	7.956	4.025	2.997	3.623	7.450	29.980	19.010	18.810
1992	16.850	14.680	17.760	26.770	8.376	3.776	4.493	7.486	12.710	11.820	26.670	44.480	16.320
Mean	33.680	30.130	28.260	19.660	12.540	8.944	7.378	8.864	9.902	18.540	23.810	31.990	19.440
Min	13.110	11.360	7.465	7.120	4.585	3.776	2.712	1.959	2.819	7.450	7.541	12.240	11.520
	1973	1973	1973	1990	1990	1992	1984	1976	1989	1991	1983	1975	1973
Max	56.800	59.830	71.680	46.690	32.370	17.180	19.160	24.220	16.090	53.710	44.280	62.830	23.540
	1982	1990	1979	1986	1983	1983	1988	1985	1985	1976	1984	1979	1980

The summary relates exclusively to the years shown. The yearly mean discharge makes allowance for incomplete years.

Period requested : 1973 - 1992

Gauged flow data available : Nov 1955 - Dec 1992

Station and Catchment Description

027071 Catchment area : 1363.0 sq km

Grid reference : 4425 4734

Crump profile weir with high flow calibration based on u/s cableway (at Leckby Grange). Flows prior to June 1980 derived exclusively from Leckby Grange (station 027008, C.A.: 1345.6 sq.kms - variable low flow control, weedgrowth especially severe in 1976 - July/Aug. flows estimated). Sensibly natural regime, flashy response.
Rural catchment draining the northern Yorkshire Dales, lower catchment in the flat Vale of York. Mixed geology - mainly limestones, sandstones (especially below Richmond) and shales; covering of Boulder Clay.

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6 MAY 1994

UK NATIONAL RIVER FLOW ARCHIVE

RETRIEVAL OPTION 4 - MONTHLY MEAN GAUGED DISCHARGES IN CUBIC METRES PER SECOND

027075 Bedale Beck at Leeming

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1983	-	-	-	-	3.993	2.197	0.677	0.481	0.463	-	0.454	4.028	-
1984	5.798	8.756	2.696	1.265	0.705	0.519	0.302	0.291	0.445	0.485	4.263	1.455	2.220
1985	3.386	1.598	1.400	2.409	1.718	0.786	0.546	1.602	0.762	0.585	0.905	3.674	1.619
1986	5.825	2.426	3.808	6.680	2.366	0.910	0.522	3.499	0.521	0.411	1.891	3.504	2.701
1987	2.278	1.472	3.056	3.428	0.846	0.813	0.962	0.704	0.667	4.621	3.058	2.229	2.016
1988	5.603	6.388	2.028	1.084	1.018	0.550	1.450	0.744	0.646	2.503	2.185	3.862	2.330
1989	1.097	2.102	2.751	2.245	0.771	0.503	0.393	0.317	0.275	0.318	0.644	2.253	1.134
1990	4.842	8.927	1.687	0.731	0.506	0.416	0.361	0.426	0.302	0.345	0.463	3.552	1.837
1991	6.640	-	5.109	1.415	0.732	0.563	0.407	0.343	0.302	0.506	2.001	2.149	-
1992	1.552	0.876	1.790	1.861	0.631	0.432	0.407	0.373	0.659	0.688	1.180	7.224	1.481
Mean	4.113	4.085	2.703	2.346	1.329	0.769	0.603	0.878	0.504	1.162	1.704	3.393	1.958
Min	1.097	0.876	1.400	0.731	0.506	0.416	0.302	0.291	0.275	0.318	0.454	1.455	1.134
	1989	1992	1985	1990	1990	1990	1984	1984	1989	1989	1983	1984	1989
Max	6.640	8.927	5.109	6.680	3.993	2.197	1.450	3.499	0.762	4.621	4.263	7.224	2.701
	1991	1990	1991	1986	1983	1983	1988	1986	1985	1987	1984	1992	1986

The summary relates exclusively to the years shown. The yearly mean discharge makes allowance for incomplete years.

Period requested : Record up to 1992

Gauged flow data available : May 1983 - Dec 1992

Station and Catchment Description

027075 Catchment area : 160.3 sq km

Grid reference : 4306 4903

Flat V weir, 1:10 cross-slope. High flow record is suspect - the structure drowns as a result of backing-up from the Swale (a chart recorder monitors d/s levels but processed flows assume modularity). Considerable spray irrigation in the lower reaches otherwise minimal artificial impact on flow regime.
Rural, W-E trending catchment draining from Bellerby Moor.

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6 MAY 199

027082 Cundall Beck at Bat Bridge

Measuring authority: NRA-NY Grid reference: 44 (SE) 419 724 Catchment area (sq km):

First year: 1986 Level stn. (m OD): Max alt. (m OD):

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1987	0.198	0.161	0.265	0.344	0.097	0.103	0.078	0.080	0.079	0.456	0.183	0.169	0.185
1988	0.517	0.539	0.189	0.113	0.102	0.070	0.177	0.143	0.090	0.164	0.244	0.317	0.221
1989	0.091	0.139	0.125	0.127	0.062	0.057	0.053	0.032	0.037	0.058	0.051	0.099	0.077
1990	0.378	0.313	0.113	0.064	0.047	0.044	0.031	0.075	0.062	0.046	0.035	0.229	0.119
1991	0.222	0.775	0.270	0.091	0.060	0.046	0.042	0.035	0.036	0.027	0.068	0.055	0.140
1992	0.093	0.069	0.085	0.097	0.039	0.068	0.124	0.127	0.099	0.067	0.134	0.544	0.129

MONTHLY AND YEARLY STATISTICS FOR PREVIOUS RECORD (Jan 1987 to Dec 1991)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean flows (m3/s):	Avg.	0.281	0.386	0.193	0.148	0.074	0.064	0.076	0.073	0.061	0.150	0.116	0.174	0.148
	Low	0.091	0.139	0.113	0.064	0.047	0.044	0.031	0.032	0.036	0.027	0.035	0.055	0.077
	High	0.517	0.775	0.270	0.344	0.102	0.103	0.177	0.143	0.090	0.456	0.244	0.317	0.221

Factors affecting runoff:

Station type: FV

1992 runoff is % of previous mean

rainfall 108%

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027086 Skell at Alma Weir

Measuring authority: NRA-NY Grid reference: 44 (SE) 316 709 Catchment area (sq km):

First year: 1984 Level stn. (m OD): Max alt. (m OD):

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
						0.130	0.374	0.944	3.410	1.485			
1985	2.095	1.159	1.123	2.371	1.303	0.467	0.419	1.445	0.582	0.742	1.335	2.611	1.307
1986	3.451	1.688	2.416	4.153	1.688	0.643	0.279	0.741	0.331	0.436	2.356	3.303	1.790
1987	1.850	1.242	1.877	2.497	0.506	0.836	0.418	0.631	0.885	2.256	2.229	1.625	1.403
1988	4.122	4.175	1.610	0.758	0.847	0.286	0.986	1.006	0.831	2.454	1.542	2.244	1.735
1989	0.800	1.751	2.422	2.541	0.622	0.365	0.374	-	-	-	0.577	1.984	-
1990	3.352	4.678	1.625	0.588	0.309	0.250	0.228	0.106	0.106	0.485	0.481	2.388	1.197
1991	3.007	2.803	3.217	1.303	-	-	0.189	0.126	0.101	0.245	1.469	1.218	-
1992	1.338	0.972	1.378	1.636	0.517	0.294	0.252	0.313	0.969	1.069	2.285	3.167	1.182

MONTHLY AND YEARLY STATISTICS FOR PREVIOUS RECORD (Aug 1984 to Dec 1991----incomplete or missing months total 0.4 years)

Mean	Avg.	2.668	2.500	2.042	2.030	0.879	0.475	0.413	0.598	0.459	1.080	1.675	2.107	1.405
flows	Low	0.800	1.159	1.123	0.588	0.309	0.250	0.189	0.106	0.101	0.245	0.481	1.218	1.197
(m3/s):	High	4.122	4.678	3.217	4.153	1.688	0.836	0.986	1.445	0.885	2.454	3.410	3.303	1.790

Factors affecting runoff: 1992 runoff is % of previous mean

Station type: FV

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APPENDIX 2: Station Files for the Ouse Catchment

National River Flow Archive
Data Retrieval Service

River Flow Measuring Station Information Sheet

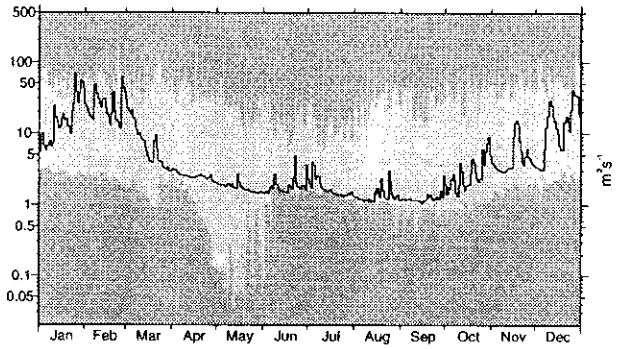
Nidd at Hunsingore Weir

Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 428 530
Station Type: Broad-crested weir

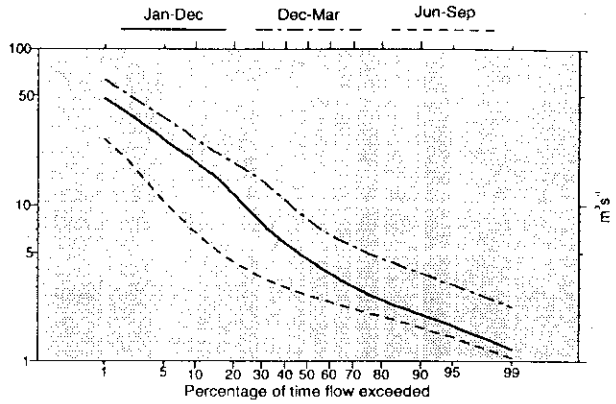
Gauged Flows and Rainfall: 1935-1992
IH Station Number: 27001
Local Number: 8912104

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1935 to 1992 excluding those for the featured year (1990; mean flow: 7.25 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	8.09	
Mean flow (ls^{-1}/km^2)	16.70	
Mean flow ($10^6m^3/yr$)	255.0	
Peak flow / date	271.8	17 Oct 1967
Highest daily mean / date	219.4	28 Dec 1978
Lowest daily mean / date	0.026	20 May 1984
10 day minimum / end date	0.046	20 May 1984
60 day minimum / end date	0.426	8 Jun 1984
240 day minimum / end date	2.108	15 Nov 1990
10% exceedance (Q10)	18.870	
50% exceedance (Q50)	4.563	
95% exceedance (Q95)	1.682	
Mean annual flood	133.4	
IH Baseflow index	0.50	

Rainfall and Runoff

	Rainfall (1935-1992) mm					Runoff (1935-1992) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	99	216	1948	25	1953	80	150	1948	17	1963
Feb	78	187	1966	8	1959	66	150	1966	12	1963
Mar	72	178	1981	10	1944	58	167	1947	17	1943
Apr	64	136	1986	5	1938	42	114	1986	6	1984
May	65	165	1967	13	1970	28	74	1967	1	1984
Jun	63	173	1982	10	1941	20	50	1969	9	1957
Jul	71	163	1988	17	1984	18	55	1968	10	1959
Aug	88	185	1956	13	1947	23	95	1956	7	1959
Sep	81	217	1976	5	1959	25	97	1946	4	1959
Oct	90	213	1938	22	1972	39	152	1967	8	1955
Nov	101	225	1951	16	1945	57	132	1960	12	1964
Dec	97	223	1978	36	1963	70	168	1965	24	1953
Year	969	1202	1946	698	1975	527	800	1979	296	1964

Station and Catchment Characteristics

Station level	(mOD)	18.10
Sensitivity	(%)	11.4
Bankfull flow		376.00
Catchment area	(km^2)	484.3
Maximum altitude	(mOD)	704
FSR slope (S1085)	(m/km)	2.54
1941-70 rainfall (SAAR)	(mm)	975
FSR stream frequency (STMFRQ)	(junctions/km^2)	1.23
FSR percentage urban (URBAN)		0.

Station and Catchment Description

Broad-crested weir, breadth 49.8 m. Rated by formulae, subsequently by C/M gaugings. Insensitive. Operation of by-pass sluice in the 1980s caused difficulties; flows subsequently revised. Low flows monitored d/s at Skip Bridge since 1979. Heavily reservoired headwaters (Angram, Scar House, Gouthwaite influence runoff, the latter especially significant during drought conditions). Net export of water.

Geology: Mainly Millstone Grit, Magnesian limestone and some marls. Predominantly rural, rugged in headwaters.

Factors Affecting Runoff

- Reservoir(s) in catchment affect runoff.
- Runoff reduced by public water supply abstraction.
- Regulation from surface water and/or ground water.
- Runoff increased by effluent returns.

Summary of Archived Data

Gauged Flows and Rainfall

Key:	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

	0 1 2 3 4	5 6 7 8 9
1930s	- - - - -	e A A E =
1940s	= E B A A	B B B E =
1950s	= = = E A	A A A A B
1960s	A A A A A	A A A A A
1970s	A A A A A	A A A A A
1980s	A A D A E	E B B B B
1990s	B A A	

Naturalised Flows

Key:	
All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

	0 1 2 3 4	5 6 7 8 9
1930s	- - - - -	- - F F F
1940s	F F E E E	F F F F F
1950s	F F F F E	E E E E F
1960s	E E E E E	E E F F F
1970s	E	

National River Flow Archive
Data Retrieval Service

River Flow Measuring Station Information Sheet

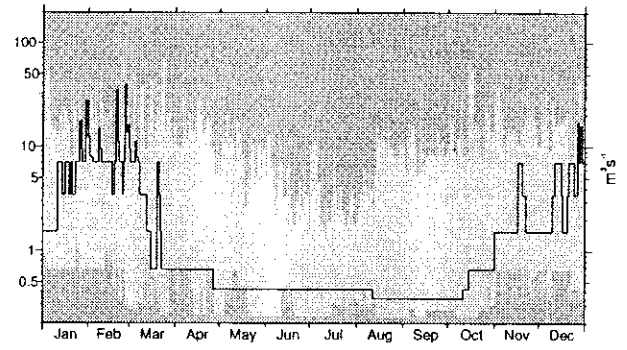
Nidd at Gouthwaite Reservoir

Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 141 683
Station Type: Miscellaneous

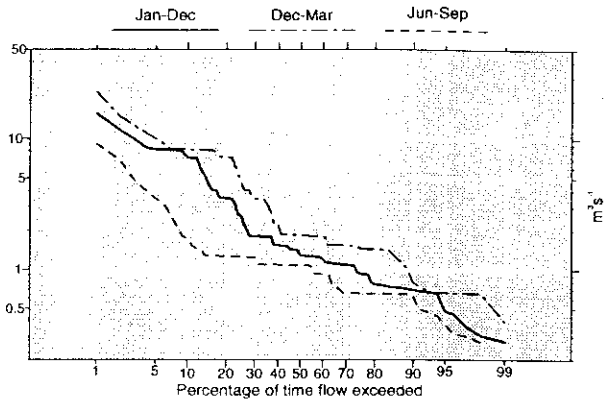
Gauged Flows and Rainfall: 1936-1992
IH Station Number: 27005
Local Number: 8912108

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1936 to 1992 excluding those for the featured year (1990; mean flow: 2.45 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	2.60	
Mean flow (ls^{-1}/km^2)	22.90	
Mean flow ($10^6m^3/yr$)	82.2	
Peak flow / date	138.7	17 Oct 1967
Highest daily mean / date	103.2	20 Sep 1946
Lowest daily mean / date	0.207	6 Dec 1964
10 day minimum / end date	0.231	20 Oct 1989
60 day minimum / end date	0.275	27 Oct 1959
240 day minimum / end date	0.532	16 Nov 1990
10% exceedance (Q10)	7.181	
50% exceedance (Q50)	1.282	
95% exceedance (Q95)	0.475	
Mean annual flood		
IH Baseflow index	0.48	

Rainfall and Runoff

	Rainfall (1936-1992) mm					Runoff (1936-1992) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	143	304	1984	33	1953	109	233	1984	33	1963
Feb	114	263	1966	15	1959	83	215	1990	16	1963
Mar	105	277	1981	13	1944	69	266	1979	16	1985
Apr	89	206	1947	10	1938	54	154	1986	13	1975
May	83	199	1967	14	1970	39	116	1967	10	1990
Jun	79	168	1980	13	1940	26	73	1972	7	1974
Jul	88	205	1988	19	1984	24	70	1968	10	1990
Aug	115	236	1956	8	1947	33	146	1954	9	1990
Sep	111	259	1976	8	1959	40	194	1946	6	1959
Oct	133	358	1938	30	1969	59	288	1967	9	1959
Nov	146	310	1951	25	1945	86	239	1963	19	1975
Dec	144	309	1979	41	1950	102	261	1979	36	1971
Year	1350	1720	1979	997	1955	723	1136	1954	399	1975

Station and Catchment Characteristics

Station level	(mOD)	122.50
Sensitivity	(%)	
Bankfull flow		
Catchment area	(km^2)	113.7
Maximum altitude	(mOD)	704
FSR slope (S1085)	(m/km)	14.40
1941-70 rainfall (SAAR)	(mm)	1354
FSR stream frequency (STMFRQ)	(junctions/km^2)	
FSR percentage urban (URBAN)		

Station and Catchment Description

Rectangular notch 12.2 m wide set in broad-crested weir (total width 29 m). Measures overflow and compensation/regulation releases from Gouthwaite Reservoir.

Factors Affecting Runoff

- Reservoir(s) in catchment affect runoff.
- Runoff reduced by public water supply abstraction.
- Regulation from surface water and/or ground water.

Summary of Archived Data

Gauged Flows and Rainfall

Key:	All rain-fall	Some or no rain-fall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

	0 1 2 3 4	5 6 7 8 9
1930s	- - - - -	- e B E =
1940s	= = = = =	E A A A A
1950s	A B B B B	B B B B B
1960s	B B B B B	B A A A A
1970s	A A B B B	B B B B B
1980s	B = B E B	B b B B B
1990s	B = B	

Naturalised Flows

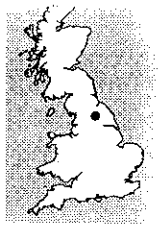
Key:

All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

	0 1 2 3 4	5 6 7 8 9
1940s	- - - - -	F E E E E
1950s	E E E E E	F E E E E
1960s	E E E E E	E E E E F

River Flow Measuring Station Information Sheet

Ure at Westwick Lock

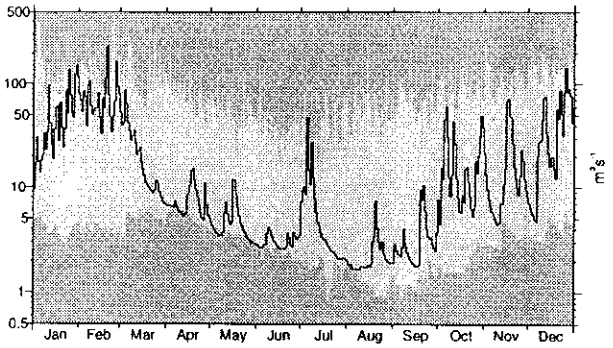


Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 356 671
Station Type: Broad-crested weir/Velocity-area

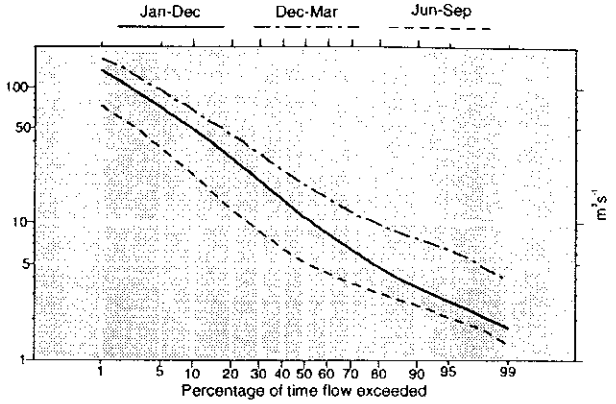
Gauged Flows and Rainfall: 1958-1992
IH Station Number: 27007
Local Number: 8912202

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1958 to 1992 excluding those for the featured year (1990; mean flow: 21.10 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	20.70	
Mean flow (ls^{-1}/km^2)	22.60	
Mean flow ($10^6m^3/yr$)	653.0	
Peak flow / date	625.9	24 Feb 1991
Highest daily mean / date	470.3	24 Feb 1991
Lowest daily mean / date	0.725	20 Jul 1972
10 day minimum / end date	0.922	27 Aug 1976
60 day minimum / end date	1.525	18 Oct 1959
240 day minimum / end date	6.822	13 Nov 1990
10% exceedance (Q10)	49.000	
50% exceedance (Q50)	10.840	
95% exceedance (Q95)	2.692	
Mean annual flood	264.9	
IH Baseflow index	0.39	

Rainfall and Runoff

	Rainfall (1958-1992) mm					Runoff (1958-1992) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	120	224	1984	38	1963	99	175	1982	12	1963
Feb	88	239	1990	12	1985	82	224	1974	10	1963
Mar	98	214	1981	28	1961	81	177	1979	30	1975
Apr	78	137	1983	8	1980	57	116	1966	16	1974
May	70	177	1967	12	1989	36	86	1983	11	1980
Jun	70	173	1982	18	1976	24	61	1972	9	1975
Jul	74	176	1988	18	1984	23	59	1988	6	1984
Aug	90	180	1985	19	1976	33	93	1971	4	1976
Sep	92	217	1976	10	1959	38	94	1968	4	1959
Oct	107	247	1967	29	1969	62	201	1967	17	1969
Nov	120	239	1963	25	1958	82	184	1963	20	1958
Dec	125	239	1979	46	1963	97	168	1965	33	1971
Year	1132	1368	1967	861	1975	714	933	1966	446	1975

Station and Catchment Characteristics

Station level	(mOD)	14.20
Sensitivity	(%)	10.6
Bankfull flow		
Catchment area	(km^2)	914.6
Maximum altitude	(mOD)	713
FSR slope (S1085)	(m/km)	3.24
1941-70 rainfall (SAAR)	(mm)	1118
FSR stream frequency (STMFRQ)	(junctions/km^2)	
FSR percentage urban (URBAN)		

Station and Catchment Description

Broad-crested masonry weir, 59m wide, rated by current meter from a cableway 0.26km d/s (replaced an earlier rated section a short distance d/s - Boroughbridge weir was thought to act as partial control). Nov.1975-Dec.1982 data awaits reprocessing; expected to increase flows. Reservoirs have significant effect on the Burn and Laver but moderate overall impact; some net export of water.

Mixed geology of limestone and grits. Large, predominantly rural catchment draining from the Pennines.

Factors Affecting Runoff

- Reservoir(s) in catchment affect runoff.
- Runoff reduced by public water supply abstraction.

Summary of Archived Data

Gauged Flows and Rainfall

Key:	All rain-fall	Some or no rain-fall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

	0 1 2 3 4	5 6 7 8 9
1950s	- - - - -	- - - e A
1960s	A A A A A	A A A A A
1970s	E B D A A	A A A E E
1980s	A A A A A	A A A A A
1990s	A A A	

Naturalised Flows

Key:	
All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

	0 1 2 3 4	5 6 7 8 9
1950s	- - - - -	- - - F E
1960s	E E E E E	E E E E E
1970s	E F	

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8th July 1994

River Flow Measuring Station Information Sheet

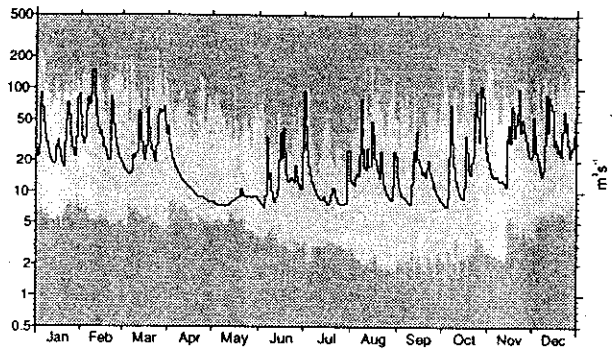
Swale at Leckby Grange

Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 415 748
Station Type: Velocity-area

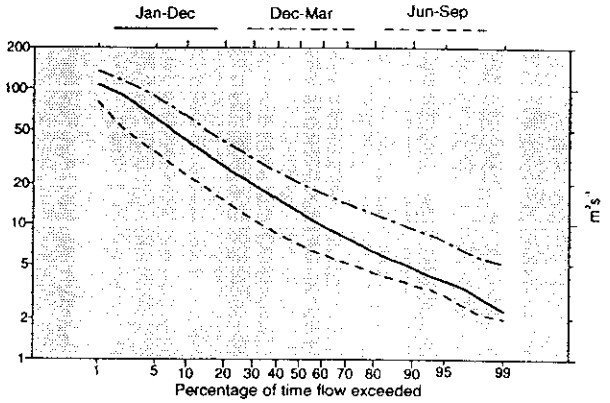
Gauged Flows and Rainfall: 1955-1984
IH Station Number: 27008
Local Number: 8912303

Daily Flow Hydrograph

Max. and min. daily mean flows from 1955 to 1984 excluding those for the featured year (1980; mean flow: 25.50 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	20.10	
Mean flow (ls^{-1}/km^2)	15.00	
Mean flow ($10^6m^3/yr$)	636.0	
Peak flow / date	255.7	7 Mar 1963
Highest daily mean / date	246.6	7 Mar 1963
Lowest daily mean / date	0.858	27 Sep 1959
10 day minimum / end date	1.740	31 Aug 1959
60 day minimum / end date	1.998	18 Oct 1959
240 day minimum / end date	5.510	13 Nov 1959
10% exceedance (Q10)	41.920	
50% exceedance (Q50)	12.260	
95% exceedance (Q95)	3.780	
Mean annual flood	175.1	
tH Baseflow index	0.48	

Rainfall and Runoff

	Rainfall (1955-1984) mm					Runoff (1955-1984) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	85	151	1984	23	1964	66	117	1982	14	1963
Feb	61	145	1966	13	1959	52	115	1966	10	1963
Mar	66	154	1979	14	1973	53	143	1979	15	1973
Apr	55	121	1983	8	1980	36	75	1966	14	1957
May	58	133	1967	18	1959	28	70	1983	12	1956
Jun	63	144	1980	18	1976	19	45	1958	7	1957
Jul	67	142	1960	16	1984	19	43	1958	7	1959
Aug	83	217	1956	20	1976	28	100	1956	4	1959
Sep	76	186	1976	15	1959	24	64	1956	4	1959
Oct	72	165	1976	18	1969	39	107	1976	9	1972
Nov	80	153	1984	20	1970	48	101	1960	14	1964
Dec	85	188	1978	31	1971	58	125	1979	18	1971
Year	851	1053	1960	610	1964	472	610	1958	262	1964

Station and Catchment Characteristics

Station level	(mOD)	12.60
Sensitivity	(%)	7.5
Bankfull flow		195.00
Catchment area	(km^2)	1346.
Maximum altitude	(mOD)	713
FSR slope (S1085)	(m/km)	2.84
1941-70 rainfall (SAAR)	(mm)	877
FSR stream frequency (STMFRQ)	(junctions/km^2)	
FSR percentage urban (URBAN)		

Station and Catchment Description

Velocity-area station, channel 22 metres wide at low flows. No single effective control - heavy summer weedgrowth. Station superseded by Crakehill (27071) in 1980 (but cableway still used for high flow calibration).

Rural catchment draining the northern Yorkshire Dales. Geology comprises mainly limestones, sandstones and shales with a covering of Boulder Clay.

Factors Affecting Runoff

- Natural to within 10% at the 95 percentile flow.

Summary of Archived Data

Gauged Flows and Rainfall

Key:	All rain-fall	Some or no rain-fall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

	0 1 2 3 4	5 6 7 8 9
1950s	- - - - -	e A A A B
1960s	A A A A A	A A A A A
1970s	A A A A A	E E E A E
1980s	A E D E E	= = = = =
1990s	= = =	

Naturalised Flows

Key:

All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

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18th July 1994

River Flow Measuring Station Information Sheet

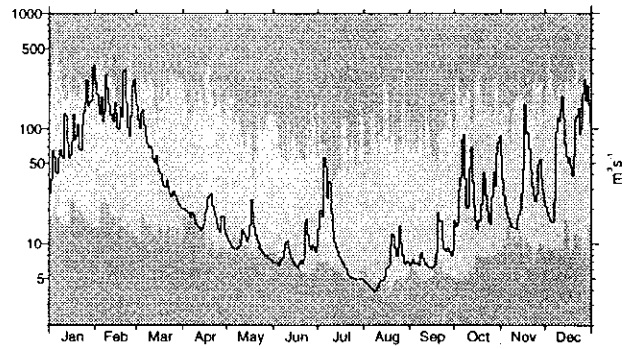
Ouse at Skelton

Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 568 554
Station Type: Velocity-area

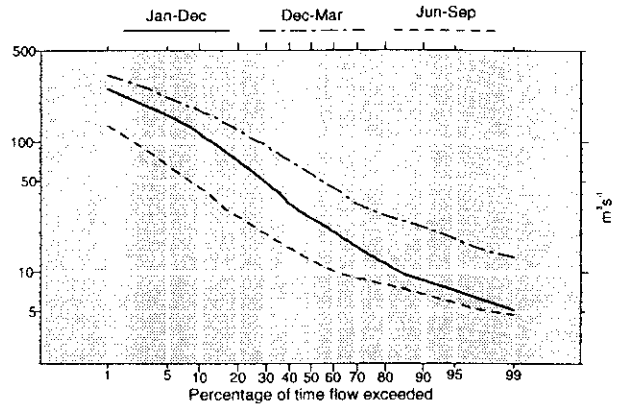
Gauged Flows and Rainfall: 1969-1992
IH Station Number: 27009
Local Number: 8912405

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1969 to 1992 excluding those for the featured year (1990; mean flow: 47.70 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	48.60	
Mean flow (ls^{-1}/km^2)	14.70	
Mean flow ($10^6m^3/yr$)	1530.0	
Peak flow / date	622.0	5 Jan 1982
Highest daily mean / date	609.0	5 Jan 1982
Lowest daily mean / date	3.922	19 Aug 1976
10 day minimum / end date	4.257	11 Aug 1990
60 day minimum / end date	6.117	15 Oct 1989
240 day minimum / end date	14.570	14 Dec 1989
10% exceedance (Q10)	116.600	
50% exceedance (Q50)	25.830	
95% exceedance (Q95)	7.268	
Mean annual flood	302.0	
IH Baseflow index	0.43	

Rainfall and Runoff

	Rainfall (1969-1992) mm					Runoff (1969-1992) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	96	172	1984	33	1989	73	114	1982	29	1989
Feb	66	160	1990	9	1985	58	127	1990	24	1986
Mar	81	170	1981	20	1973	56	138	1979	20	1973
Apr	60	124	1983	8	1980	39	87	1986	13	1974
May	58	129	1979	11	1989	23	57	1983	8	1980
Jun	63	161	1982	14	1976	16	37	1972	6	1988
Jul	61	153	1988	18	1984	13	36	1988	5	1986
Aug	73	142	1985	16	1976	19	56	1971	4	1976
Sep	72	196	1976	16	1989	19	35	1974	5	1989
Oct	82	177	1976	23	1972	34	114	1976	7	1972
Nov	91	156	1984	38	1973	48	89	1984	16	1983
Dec	95	198	1978	38	1971	65	133	1979	23	1971
Year	898	1073	1979	650	1971	463	585	1980	284	1975

Station and Catchment Characteristics

Station level	(mOD)	4.60
Sensitivity	(%)	3.2
Bankfull flow		
Catchment area	(km^2)	3315.
Maximum altitude	(mOD)	713
FSR slope (S1085)	(m/km)	2.27
1941-70 rainfall (SAAR)	(mm)	918
FSR stream frequency (STMFRQ)	(junctions/km^2)	
FSR percentage urban (URBAN)		

Station and Catchment Description

Velocity-area station with control exercised mainly by Naburn weir - but since 1982 a rating independent of sluice-gate settings has been employed. Pre-1982 records are less reliable and will be reprocessed. PWS abstraction u/s - increasing impact on very low flows; some artificial GW augmentation now a counterbalancing influence. New US station commissioned 1992.

Mixed geology. Predominantly rural catchment draining the northern parts of the Vale of York and the Yorkshire Dales.

Factors Affecting Runoff

- Reservoir(s) in catchment affect runoff.
- Runoff influenced by groundwater abstraction and/or recharge.
- Runoff reduced by public water supply abstraction.
- Runoff reduced by industrial and/or agricultural abstraction.
- Regulation from surface water and/or ground water.

Summary of Archived Data

Gauged Flows and Rainfall

	0	1	2	3	4	5	6	7	8	9
1960s	-	=	=	=	=	=	=	=	=	E
1970s	A	A	A	B	D	B	A	A	A	D
1980s	A	D	A	A	A	A	A	A	A	A
1990s	A	E	A							

Key:

	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

Naturalised Flows

	0	1	2	3	4	5	6	7	8	9
1960s	-	-	-	-	-	-	-	-	-	F
1970s	E	F								

Key:

All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

National River Flow Archive
Data Retrieval Service

River Flow Measuring Station Information Sheet

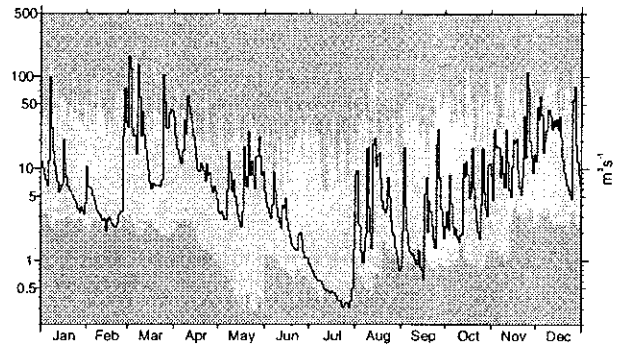
Swale at Richmond

Measuring Authority: NRA - Yorkshire
Grid Reference: 45 (NZ) 146 006
Station Type: Velocity-area

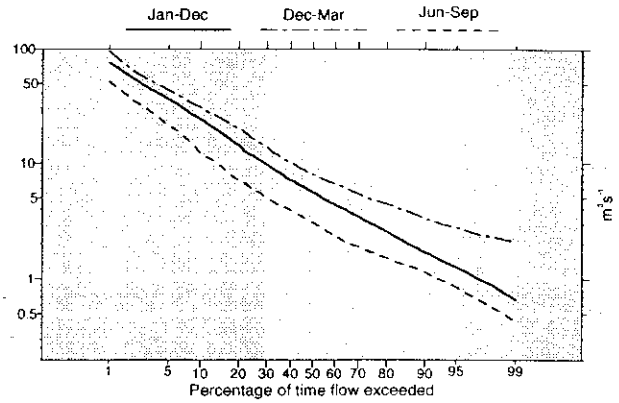
Gauged Flows and Rainfall: 1961-1980
IH Station Number: 27024
Local Number: 8912307

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1961 to 1980 excluding those for the featured year (1979; mean flow: 12.10 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	10.30	
Mean flow (ls^{-1}/km^2)	27.20	
Mean flow ($10^6m^3/yr$)	327.0	
Peak flow / date	380.0	23 Mar 1968
Highest daily mean / date	277.5	23 Mar 1968
Lowest daily mean / date	0.261	31 May 1980
10 day minimum / end date	0.298	31 May 1980
60 day minimum / end date	1.068	2 Aug 1976
240 day minimum / end date	4.434	22 Nov 1975
10% exceedance (Q10)	24.170	
50% exceedance (Q50)	5.565	
95% exceedance (Q95)	1.263	
Mean annual flood	273.3	
IH Baseflow index	0.35	

Rainfall and Runoff

	Rainfall (1961-1980) mm					Runoff (1961-1980) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	120	205	1974	38	1973	106	194	1962	21	1963
Feb	91	212	1966	32	1975	83	206	1966	16	1963
Mar	106	241	1979	30	1973	100	251	1979	33	1973
Apr	83	132	1966	10	1980	72	137	1966	19	1974
May	84	176	1967	25	1970	48	125	1967	3	1980
Jun	79	173	1980	20	1976	31	71	1972	6	1978
Jul	82	138	1973	38	1977	30	73	1963	4	1979
Aug	107	224	1971	34	1976	48	117	1971	15	1977
Sep	103	212	1976	20	1971	54	127	1968	8	1972
Oct	106	283	1967	23	1969	75	245	1967	10	1972
Nov	127	251	1963	45	1973	99	230	1963	35	1975
Dec	123	291	1978	36	1972	111	190	1965	42	1971
Year	1211	1474	1967	913	1975	857	1217	1967	543	1975

Station and Catchment Characteristics

Station level	(mOD)	107.60
Sensitivity	(%)	
Bankfull flow		
Catchment area	(km^2)	381.0
Maximum altitude	(mOD)	713
FSR slope (S1085)	(m/km)	
1941-70 rainfall (SAAR)	(mm)	
FSR stream frequency (STMFRQ)	(junctions/km^2)	
FSR percentage urban (URBAN)		

Factors Affecting Runoff

- Natural to within 10% at the 95 percentile flow.

Summary of Archived Data

Gauged Flows and Rainfall

	0	1	2	3	4	5	6	7	8	9
1960s	-	e	A	A	A	A	A	A	A	A
1970s	A	A	A	A	A	A	E	A	A	A
1980s	E	=	-	=	=	=	=	=	=	=
1990s	=	=	=							

Key:	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

Naturalised Flows

	0	1	2	3	4	5	6	7	8	9
1960s	-	F	E	E	E		F			

Key:

All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

National River Flow Archive
Data Retrieval Service

River Flow Measuring Station Information Sheet

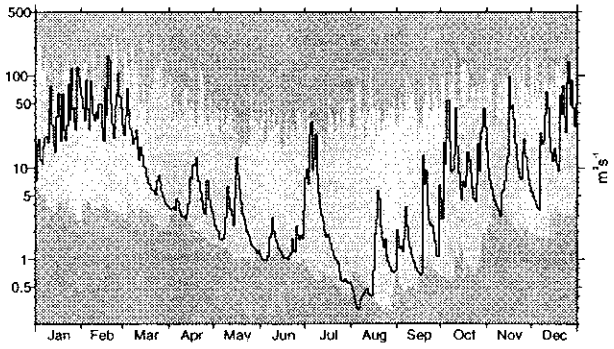
Ure at Kilgram Bridge

Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 190 860
Station Type: Velocity-area

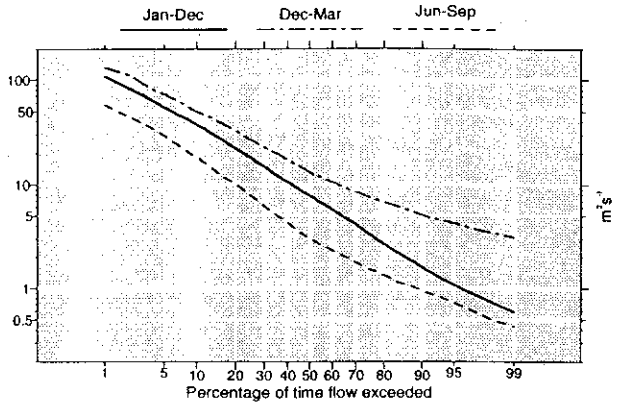
Gauged Flows and Rainfall: 1967-1992
IH Station Number: 27034
Local Number: 8912206

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1967 to 1992 excluding those for the featured year (1990; mean flow: 16.30 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	15.30	
Mean flow (ls^{-1}/km^2)	30.00	
Mean flow ($10^6m^3/yr$)	484.0	
Peak flow / date	382.6	23 Feb 1991
Highest daily mean / date	349.7	23 Feb 1991
Lowest daily mean / date	0.276	25 Aug 1976
10 day minimum / end date	0.299	27 Aug 1976
60 day minimum / end date	0.931	9 Sep 1976
240 day minimum / end date	4.968	14 Dec 1989
10% exceedance (Q10)	37.730	
50% exceedance (Q50)	7.836	
95% exceedance (Q95)	1.070	
Mean annual flood	236.2	
IH Baseflow index	0.32	

Rainfall and Runoff

	Rainfall (1967-1992) mm					Runoff (1967-1992) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	152	264	1990	62	1987	136	213	1990	70	1989
Feb	107	313	1990	17	1985	100	269	1990	31	1986
Mar	129	264	1981	50	1975	111	260	1979	35	1975
Apr	82	166	1970	7	1980	67	135	1970	15	1982
May	81	298	1983	17	1989	40	98	1983	6	1980
Jun	77	161	1980	19	1988	30	83	1972	8	1990
Jul	76	203	1988	20	1984	27	89	1988	3	1984
Aug	102	223	1985	23	1976	41	142	1985	3	1976
Sep	110	231	1968	20	1986	54	131	1968	6	1972
Oct	136	330	1967	35	1969	94	282	1967	10	1972
Nov	150	226	1984	55	1983	118	190	1982	43	1983
Dec	153	280	1986	63	1971	130	240	1979	45	1981
Year	1355	1593	1986	1027	1975	948	1203	1986	645	1975

Station and Catchment Characteristics

Station level	(mOD)	87.50
Sensitivity	(%)	17.6
Bankfull flow		375.00
Catchment area	(km^2)	510.2
Maximum altitude	(mOD)	713
FSR slope (S1085)	(m/km)	4.01
1941-70 rainfall (SAAR)	(mm)	1346
FSR stream frequency (STMFRQ)	(junctions/km^2)	2.40
FSR percentage urban (URBAN)		0.

Station and Catchment Description

Velocity-area station rated by current meter. Low flow control is exercised by the sill of Kilgram Bridge 70m d/s. Flows < 1 cumec underestimated, recalibration scheduled. Some floodplain storage. Largely natural regime; minor export of water - Thorton Steward abstraction (operational from 1977) is just upstream.

Geology is mainly Carboniferous Limestone and Millstone Grit. Rural catchment draining from the Pennines.

Factors Affecting Runoff

- Natural to within 10% at the 95 percentile flow.

Summary of Archived Data

Gauged Flows and Rainfall

	0	1	2	3	4	5	6	7	8	9
1960s	-	-	-	-	-	-	-	e	B	A
1970s	B	A	A	A	A	A	A	A	A	A
1980s	A	A	A	A	A	A	A	A	A	A
1990s	A	A	A							

Key:

	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

Naturalised Flows

Key:

All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

National River Flow Archive
Data Retrieval Service

River Flow Measuring Station Information Sheet

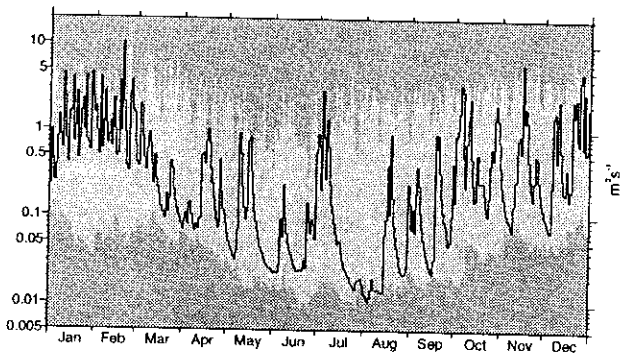
Snaizeholme Beck at Low Houses

Measuring Authority: NRA - Yorkshire
Grid Reference: 34 (SD) 833 883
Station Type: Flat V

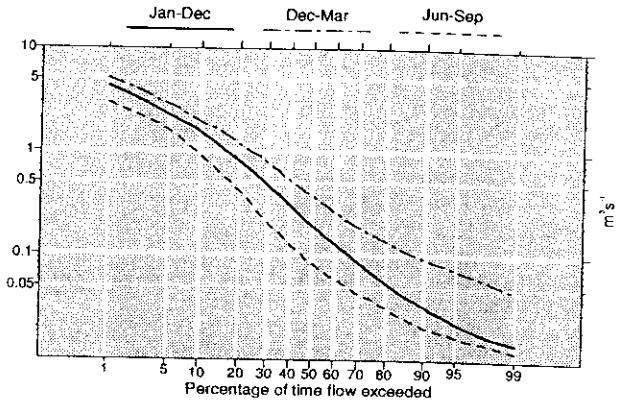
Gauged Flows and Rainfall: 1972-1992
IH Station Number: 27047
Local Number: 8912290

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1972 to 1992 excluding those for the featured year (1990; mean flow: 0.59 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	0.56	
Mean flow (ls^{-1}/km^2)	55.40	
Mean flow ($10^6m^3/yr$)	17.8	
Peak flow / date	16.1	10 Nov 1991
Highest daily mean / date	12.2	23 Feb 1991
Lowest daily mean / date	0.008	25 Jun 1989
10 day minimum / end date	0.010	25 Jun 1989
60 day minimum / end date	0.026	25 Jun 1989
240 day minimum / end date	0.214	7 Oct 1984
10% exceedance (Q10)	1.544	
50% exceedance (Q50)	0.191	
95% exceedance (Q95)	0.023	
Mean annual flood		
IH Baseflow index	0.19	

Rainfall and Runoff

	Rainfall (1972-1992) mm					Runoff (1972-1992) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	193	374	1990	70	1987	239	393	1990	112	1992
Feb	139	423	1990	17	1985	183	421	1990	53	1985
Mar	165	405	1981	54	1975	194	444	1981	59	1975
Apr	87	160	1977	6	1980	90	178	1985	12	1974
May	86	201	1986	23	1991	61	190	1986	6	1980
Jun	93	179	1972	19	1988	51	130	1987	6	1992
Jul	104	285	1988	28	1984	58	209	1988	6	1984
Aug	141	334	1985	31	1976	89	194	1988	7	1976
Sep	153	276	1981	23	1986	126	253	1974	12	1972
Oct	175	285	1980	59	1978	178	295	1980	40	1972
Nov	213	310	1978	85	1983	224	347	1986	99	1988
Dec	217	390	1986	74	1981	255	423	1986	99	1976
Year	1766	2071	1986	1291	1973	1748	1998	1980	1317	1976

Station and Catchment Characteristics

Station level	(mOD)	260.00
Sensitivity	(%)	36.1
Bankfull flow		
Catchment area	(km^2)	10.2
Maximum altitude	(mOD)	668
FSR slope (S1085)	(m/km)	28.16
1941-70 rainfall (SAAR)	(mm)	1780
FSR stream frequency (STMFRQ)	(junctions/km^2)	
FSR percentage urban (URBAN)		

Station and Catchment Description

Flat V weir installed in 1985 superseded a limited capacity, wooden trapezoidal flume. Bypassing now less common; pre-1985 it was a feature of several floods each year. Structurefull now 0.95 metres. Flashy, natural regime but possibility of minor amount of spring water deriving from outside the topographical catchment.

Wet, steep catchment in the Pennines developed mainly on Carboniferous Limestone; some Millstone Grit on the south-eastern boundary. Land use is mostly rough grazing.

Factors Affecting Runoff

- Natural to within 10% at the 95 percentile flow.

Summary of Archived Data

Gauged Flows and Rainfall

	0	1	2	3	4	5	6	7	8	9
1970s	-	=	E	A	A	A	A	A	A	E
1980s	A	E	A	D	A	E	D	D	A	A
1990s	A	A	A							

Key:	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

Naturalised Flows

Key:

All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

National River Flow Archive
Data Retrieval Service

River Flow Measuring Station Information Sheet

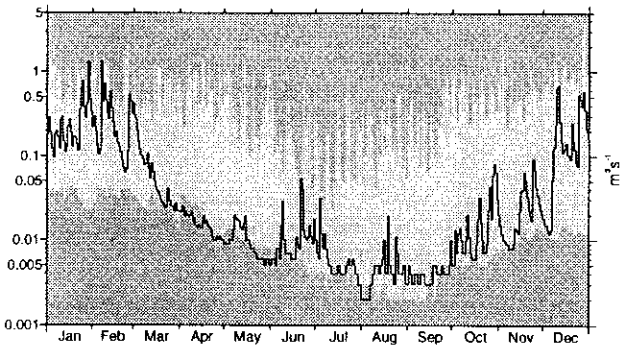
Crimple at Burn Bridge

Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 284 519
Station Type: Flat V

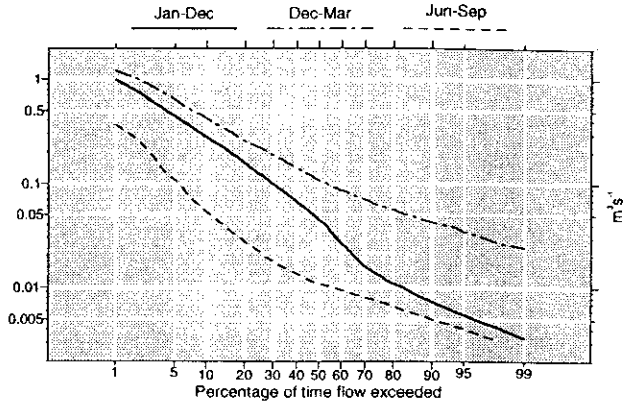
Gauged Flows and Rainfall: 1972-1992
IH Station Number: 27051
Local Number: 8912120

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1972 to 1992 excluding those for the featured year (1990; mean flow: 0.08 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	0.11	
Mean flow (ls^{-1}/km^2)	13.40	
Mean flow ($10^6m^3/yr$)	3.4	
Peak flow / date	7.4	9 Dec 1983
Highest daily mean / date	3.6	28 Dec 1978
Lowest daily mean / date	0.002	1 Sep 1991
10 day minimum / end date	0.002	28 Aug 1976
60 day minimum / end date	0.003	25 Sep 1991
240 day minimum / end date	0.011	15 Nov 1990
10% exceedance (Q10)	0.278	
50% exceedance (Q50)	0.045	
95% exceedance (Q95)	0.005	
Mean annual flood		
IH Baseflow index	0.31	

Rainfall and Runoff

	Rainfall (1972-1992) mm					Runoff (1972-1992) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	84	164	1984	23	1989	73	116	1988	19	1989
Feb	62	159	1977	8	1985	57	154	1977	19	1982
Mar	75	141	1981	14	1973	52	127	1981	18	1973
Apr	56	133	1986	9	1980	34	113	1986	5	1990
May	56	116	1976	14	1991	20	69	1983	3	1990
Jun	59	186	1982	14	1976	9	26	1972	3	1974
Jul	56	149	1988	17	1984	7	32	1973	1	1976
Aug	69	125	1986	9	1976	10	33	1988	1	1976
Sep	72	235	1976	16	1989	13	54	1976	1	1991
Oct	80	152	1976	20	1972	33	123	1976	2	1972
Nov	75	146	1984	34	1973	44	112	1984	5	1975
Dec	88	212	1978	41	1975	70	163	1978	15	1975
Year	832	973	1981	560	1975	422	563	1986	269	1989

Station and Catchment Characteristics

Station level	(mOD)	112.00
Sensitivity	(%)	54.0
Bankfull flow		
Catchment area	(km^2)	8.1
Maximum altitude	(mOD)	247
FSR slope (S1085)	(m/km)	25.61
1941-70 rainfall (SAAR)	(mm)	866
FSR stream frequency (STMFRQ)	(junctions/km^2)	1.53
FSR percentage urban (URBAN)		0.

Station and Catchment Description

Flat V weir, 3.5m wide. Theoretical rating. Subcatchment flows have been measured by Leeds University. No artificial influences.

Geology is Carboniferous shales and grits. Rural catchment, mainly used for pasture.

Factors Affecting Runoff

- Natural to within 10% at the 95 percentile flow.

Summary of Archived Data

Gauged Flows and Rainfall

	0	1	2	3	4	5	6	7	8	9
1970s	-	-	e	A	A	E	A	A	A	E
1980s	A	A	D	A	A	A	A	A	A	A
1990s	A	A	A							

Key:	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

Naturalised Flows

Key:

All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

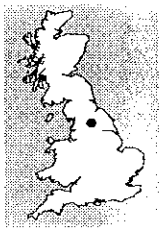
National River Flow Archive
Data Retrieval Service

River Flow Measuring Station Information Sheet

Nidd at Birstwith

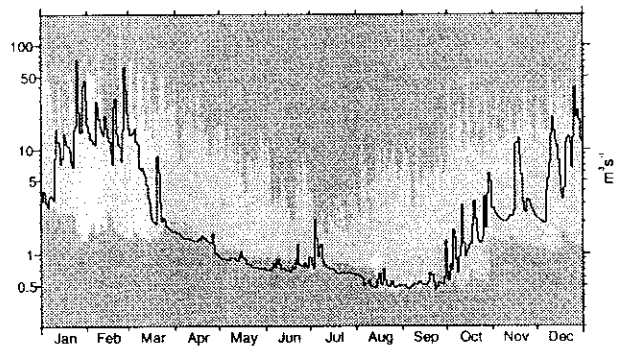
Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 230 603
Station Type: Velocity-area

Gauged Flows and Rainfall: 1975-1992
IH Station Number: 27053
Local Number: 8912106

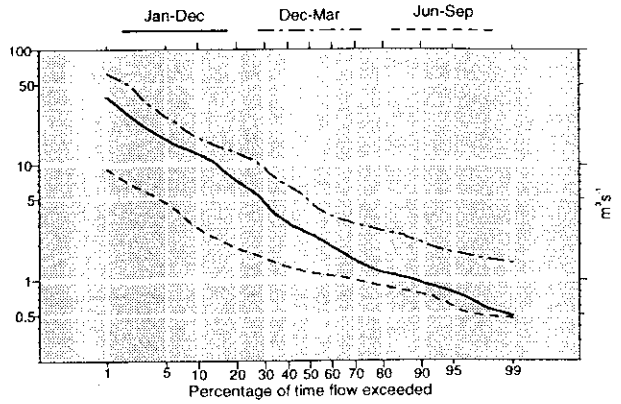


Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1975 to 1992 excluding those for the featured year (1990; mean flow: 4.84 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	5.02	
Mean flow (ls^{-1}/km^2)	23.10	
Mean flow ($10^6m^3/yr$)	159.0	
Peak flow / date	282.8	23 Feb 1991
Highest daily mean / date	179.7	23 Feb 1991
Lowest daily mean / date	0.392	21 Aug 1984
10 day minimum / end date	0.415	29 Aug 1984
60 day minimum / end date	0.523	29 Sep 1990
240 day minimum / end date	1.076	15 Nov 1990
10% exceedance (Q10)	12.290	
50% exceedance (Q50)	2.466	
95% exceedance (Q95)	0.779	
Mean annual flood		
IH Baseflow index	0.44	

Rainfall and Runoff

	Rainfall (1976-1992) mm					Runoff (1975-1992) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	140	250	1984	52	1989	120	198	1988	38	1989
Feb	102	213	1990	16	1985	94	203	1990	34	1992
Mar	129	243	1981	53	1990	98	260	1979	24	1985
Apr	77	165	1986	11	1980	52	152	1986	16	1990
May	72	149	1976	16	1989	32	87	1983	10	1990
Jun	78	185	1982	16	1976	20	37	1982	9	1990
Jul	62	191	1988	18	1984	15	27	1988	10	1990
Aug	102	192	1985	22	1976	22	70	1985	7	1990
Sep	105	253	1976	22	1986	24	47	1985	6	1991
Oct	132	223	1976	36	1978	55	186	1976	9	1991
Nov	130	208	1982	62	1983	79	153	1984	23	1975
Dec	153	258	1978	80	1981	118	250	1979	44	1975
Year	1282	1471	1979	1068	1989	729	1036	1979	528	1989

Station and Catchment Characteristics

Station level	(mOD)	67.40
Sensitivity	(%)	9.9
Bankfull flow		
Catchment area	(km^2)	217.6
Maximum altitude	(mOD)	705
FSR slope (S1085)	(m/km)	
1941-70 rainfall (SAAR)	(mm)	1209
FSR stream frequency (STMFRQ)	(junctions/km^2)	
FSR percentage urban (URBAN)		

Station and Catchment Description

Velocity-area station approximately 17m wide, rated by current metering (to 30 cumecs only) from bridge at the section. Riffle control, may be subject to erosion. Heavily reservoired catchment with substantial effect on flows.

Geology is mostly Millstone Grit. Rural catchment.

Factors Affecting Runoff

- Reservoir(s) in catchment affect runoff.
- Runoff reduced by public water supply abstraction.
- Regulation from surface water and/or ground water.

Summary of Archived Data

Gauged Flows and Rainfall

	0	1	2	3	4	5	6	7	8	9
1970s	-	-	-	-	-	e	E	A	A	A
1980s	A	A	A	A	A	A	A	A	A	A
1990s	A	A	A							

Key:	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

Naturalised Flows

Key:

All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

River Flow Measuring Station Information Sheet

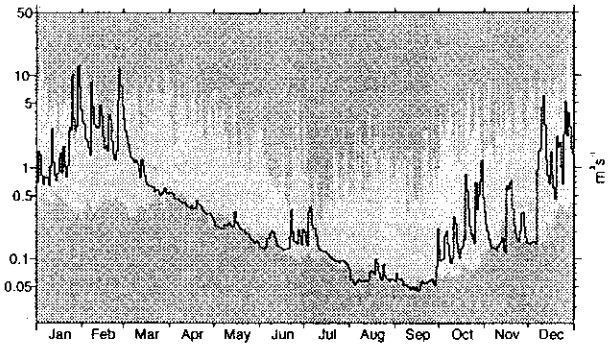
Laver at Ripon

Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 301 710
Station Type: Crump weir

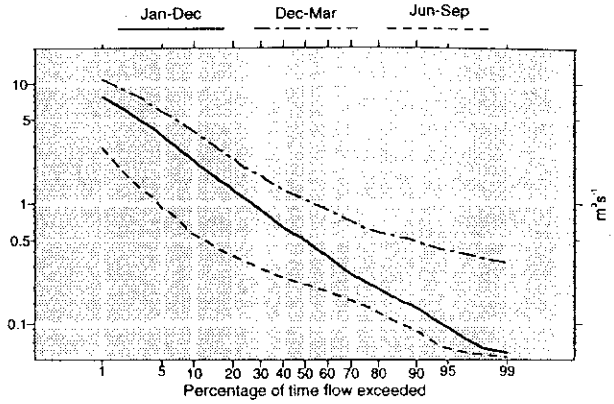
Gauged Flows and Rainfall: 1977-1992
IH Station Number: 27059
Local Number: 8912220

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1977 to 1992 excluding those for the featured year (1990; mean flow: 0.82 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	1.02	
Mean flow (ls^{-1}/km^2)	11.70	
Mean flow ($10^6m^3/yr$)	32.3	
Peak flow / date	39.1	28 Dec 1978
Highest daily mean / date	28.1	28 Dec 1978
Lowest daily mean / date	0.045	16 Sep 1990
10 day minimum / end date	0.048	17 Sep 1990
60 day minimum / end date	0.060	28 Sep 1990
240 day minimum / end date	0.184	6 Dec 1990
10% exceedance (Q10)	2.267	
50% exceedance (Q50)	0.495	
95% exceedance (Q95)	0.093	
Mean annual flood		
IH Baseflow index	0.42	

Rainfall and Runoff

	Rainfall (1978-1992) mm					Runoff (1977-1992) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	100	194	1984	23	1989	59	100	1984	14	1989
Feb	71	161	1990	10	1985	47	95	1990	16	1992
Mar	95	169	1979	28	1990	52	118	1979	22	1985
Apr	62	139	1986	9	1980	36	91	1986	12	1990
May	53	126	1979	6	1989	20	58	1983	7	1990
Jun	64	164	1982	26	1988	13	37	1982	5	1990
Jul	51	150	1988	15	1984	8	21	1988	3	1984
Aug	79	140	1985	15	1991	11	29	1985	2	1990
Sep	67	130	1981	14	1989	9	19	1992	2	1990
Oct	90	138	1981	18	1978	21	53	1988	5	1991
Nov	92	160	1984	38	1990	35	71	1982	7	1990
Dec	110	227	1978	56	1988	57	116	1978	23	1991
Year	934	1127	1979	720	1989	369	437	1986	241	1989

Station and Catchment Characteristics

Station level	(mOD)	29.60
Sensitivity	(%)	13.4
Bankfull flow		
Catchment area	(km^2)	87.5
Maximum altitude	(mOD)	406
FSR slope (S1085)	(m/km)	
1941-70 rainfall (SAAR)	(mm)	886
FSR stream frequency (STMFRQ)	(junctions/km^2)	
FSR percentage urban (URBAN)		

Station and Catchment Description

Crump profile weir, 10m wide. Theoretical rating. Insensitive at low flows, but a notch in the stilling basin toe wall could be used for very low flow measurement. Small export of water.

Geology is mostly Millstone Grit and Magnesian Limestone. A predominantly rural catchment below moorland (Pennine) headwaters. There are some swallow holes in the lower part of the catchment.

Factors Affecting Runoff

- Reservoir(s) in catchment affect runoff.
- Runoff reduced by public water supply abstraction.

Summary of Archived Data

Gauged Flows and Rainfall

	0	1	2	3	4	5	6	7	8	9
1970s	-	-	-	-	-	-	-	e	A	E
1980s	E	A	A	A	A	A	A	A	A	A
1990s	A	A	A							

Key:	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

Naturalised Flows

Key:

All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

National River Flow Archive
Data Retrieval Service

River Flow Measuring Station Information Sheet

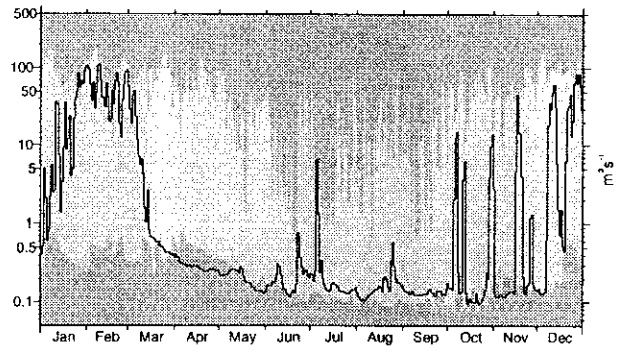
Kyle at Newton On Ouse

Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 509 602
Station Type: Flat V

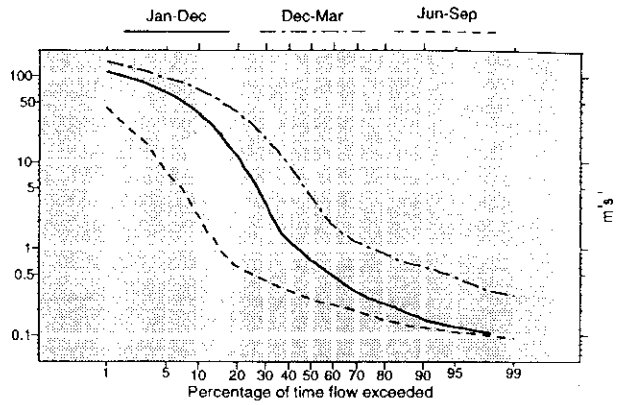
Gauged Flows and Rainfall: 1979-1992
IH Station Number: 27060
Local Number: 8912480

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1979 to 1992 excluding those for the featured year (1990; mean flow: 9.99 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	10.70	
Mean flow (ls^{-1}/km^2)	63.80	
Mean flow ($10^6m^3/yr$)	337.0	
Peak flow / date	208.3	7 Jan 1982
Highest daily mean / date	202.3	6 Jan 1982
Lowest daily mean / date	0.074	21 Oct 1991
10 day minimum / end date	0.087	27 Oct 1991
60 day minimum / end date	0.114	11 Sep 1991
240 day minimum / end date	0.517	15 Nov 1990
10% exceedance (Q10)	37.250	
50% exceedance (Q50)	0.739	
95% exceedance (Q95)	0.126	
Mean annual flood		
IH Baseflow index	0.09	

Rainfall and Runoff

	Rainfall (1979-1992) mm					Runoff (1979-1992) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	54	105	1984	13	1989	378	692	1982	34	1989
Feb	39	73	1990	4	1985	312	827	1990	37	1982
Mar	60	111	1981	9	1990	284	958	1981	49	1985
Apr	42	93	1983	6	1980	158	483	1986	4	1990
May	45	114	1979	10	1991	58	268	1983	3	1990
Jun	61	156	1982	21	1983	32	214	1982	2	1992
Jul	45	112	1988	17	1984	20	122	1988	2	1984
Aug	66	100	1979	10	1991	35	133	1985	2	1991
Sep	48	108	1984	9	1989	29	97	1981	2	1989
Oct	61	105	1987	31	1985	124	412	1987	6	1991
Nov	56	98	1984	25	1990	210	548	1982	19	1983
Dec	59	119	1979	22	1988	374	905	1979	104	1981
Year	636	719	1988	440	1989	2013	2497	1986	898	1989

Station and Catchment Characteristics

Station level	(mOD)	5.70
Sensitivity	(%)	27.0
Bankfull flow		
Catchment area	(km^2)	167.6
Maximum altitude	(mOD)	148
FSR slope (S1085)	(m/km)	
1941-70 rainfall (SAAR)	(mm)	637
FSR stream frequency (STMFRQ)	(junctions/km^2)	
FSR percentage urban (URBAN)		

Station and Catchment Description

Theoretically rated Flat V weir, 6m wide. Flow record very inaccurate above the low flow range; weir subject to drowning due to backing up from the Ouse - confluence is just d/s. High flows and runoff totals erroneous - substantial overestimation.

Flat rural catchment draining part of the Vale of York. Triassic sandstones and marls.

Factors Affecting Runoff

- Runoff influenced by groundwater abstraction and/or recharge.

Summary of Archived Data

Gauged Flows and Rainfall

	0 1 2 3 4	5 6 7 8 9
1970s	- - - - -	- - - - e
1980s	A A A A A	A A A A A
1990s	A A A	

Key:	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

Naturalised Flows

Key:

All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

National River Flow Archive
Data Retrieval Service

River Flow Measuring Station Information Sheet

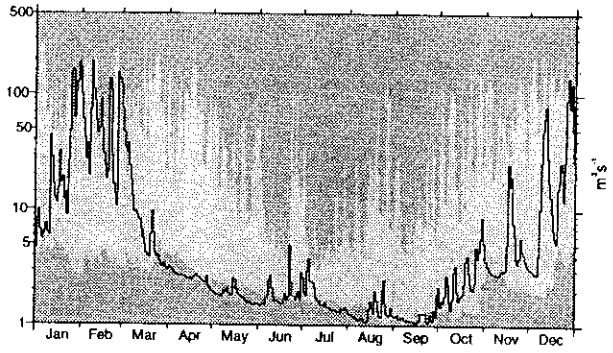
Nidd at Skip Bridge

Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 482 561
Station Type: Flat V

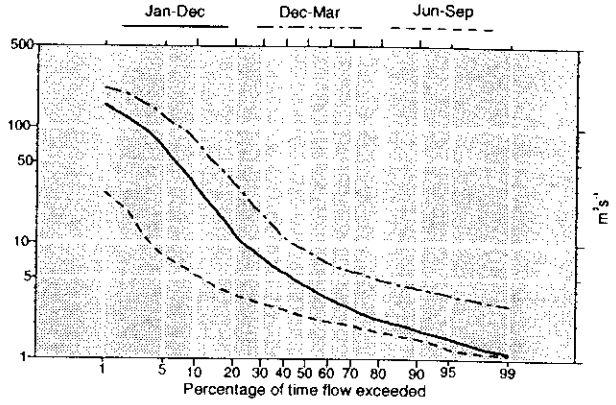
Gauged Flows and Rainfall: 1979-1992
IH Station Number: 27062
Local Number: 8912102

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1979 to 1992 excluding those for the featured year (1990; mean flow: 14.10 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	14.10	
Mean flow (ls^{-1}/km^2)	27.30	
Mean flow ($10^6m^3/yr$)	444.0	
Peak flow / date	300.7	24 Feb 1991
Highest daily mean / date	275.7	5 Jan 1982
Lowest daily mean / date	1.032	15 Sep 1990
10 day minimum / end date	1.089	17 Sep 1990
60 day minimum / end date	1.251	29 Sep 1990
240 day minimum / end date	2.067	16 Nov 1990
10% exceedance (Q10)	31.180	
50% exceedance (Q50)	4.284	
95% exceedance (Q95)	1.507	
Mean annual flood		
IH Baseflow index	0.29	

Rainfall and Runoff

	Rainfall (1979-1992) mm					Runoff (1979-1992) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	101	193	1984	32	1989	160	287	1988	26	1989
Feb	72	153	1990	10	1985	128	311	1990	25	1982
Mar	95	174	1981	35	1990	109	356	1981	25	1985
Apr	64	132	1986	10	1980	72	226	1986	13	1990
May	58	141	1979	14	1989	31	102	1983	9	1990
Jun	71	169	1982	27	1992	21	73	1982	10	1990
Jul	55	159	1988	17	1984	14	28	1988	8	1984
Aug	88	144	1985	19	1991	23	58	1985	7	1990
Sep	70	135	1981	17	1986	18	33	1988	6	1990
Oct	101	138	1980	56	1985	52	144	1981	8	1991
Nov	95	158	1984	44	1983	84	198	1984	18	1983
Dec	107	193	1979	57	1981	147	339	1979	51	1981
Year	977	1102	1986	810	1989	860	1108	1986	517	1989

Station and Catchment Characteristics

Station level	(mOD)	8.20
Sensitivity	(%)	6.0
Bankfull flow		
Catchment area	(km^2)	516.0
Maximum altitude	(mOD)	704
FSR slope (S1085)	(m/km)	
1941-70 rainfall (SAAR)	(mm)	950
FSR stream frequency (STMFRQ)	(junctions/km^2)	
FSR percentage urban (URBAN)		

Station and Catchment Description

Limited range Flat V weir, 17m wide. Subject to drowning and inaccurate at high flows - intended for use in conjunction with the gauge at Hunsingore (27001) which is insensitive at low flows. Heavily reservoired headwaters of the Nidd and Washburn valleys have a significant effect on flows, Gouthwaite Reservoir outflows especially significant in drought conditions.

Geology: Carboniferous Millstone Grits, Permian Marls and Triassic sandstones. Predominantly rural, rugged in headwaters.

Factors Affecting Runoff

- Reservoir(s) in catchment affect runoff.
- Runoff reduced by public water supply abstraction.
- Runoff reduced by industrial and/or agricultural abstraction.
- Regulation from surface water and/or ground water.
- Runoff increased by effluent returns.

Summary of Archived Data

Gauged Flows and Rainfall

	0 1 2 3 4	5 6 7 8 9
1970s	- - - - -	- - - - e
1980s	A E A A A	A A A A A
1990s	A A A	

Key:

	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

Naturalised Flows

Key:

All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

River Flow Measuring Station Information Sheet

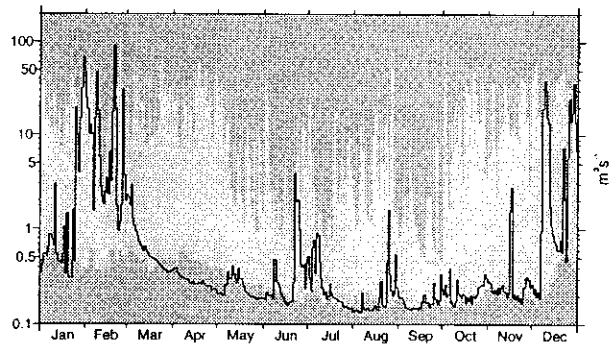
Wiske at Kirby Wiske

Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 375 844
Station Type: Flat V

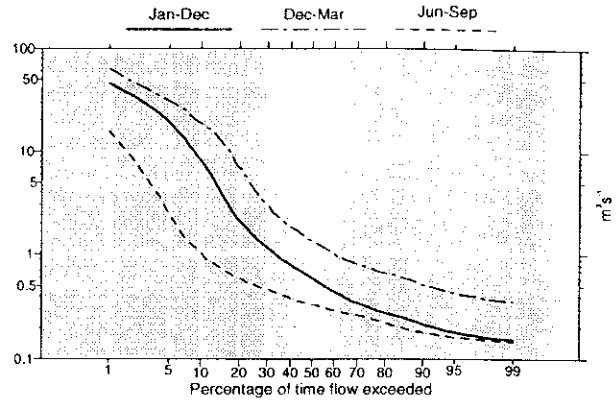
Gauged Flows and Rainfall: 1980-1992
IH Station Number: 27069
Local Number: 8912320

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1980 to 1992 excluding those for the featured year (1990; mean flow: 2.54 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	3.31	
Mean flow (ls^{-1}/km^2)	15.30	
Mean flow ($10^6m^3/yr$)	104.0	
Peak flow / date	128.6	24 Feb 1991
Highest daily mean / date	113.7	24 Feb 1991
Lowest daily mean / date	0.132	6 Aug 1990
10 day minimum / end date	0.140	6 Aug 1990
60 day minimum / end date	0.172	18 Oct 1989
240 day minimum / end date	0.285	15 Nov 1990
10% exceedance (Q10)	8.167	
50% exceedance (Q50)	0.591	
95% exceedance (Q95)	0.181	
Mean annual flood		
IH Baseflow index	0.18	

Rainfall and Runoff

	Rainfall (1984-1992) mm					Runoff (1980-1992) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	57	96	1984	10	1989	83	159	1984	8	1989
Feb	39	74	1991	3	1985	67	211	1991	10	1982
Mar	50	73	1987	11	1990	65	228	1981	10	1990
Apr	49	112	1986	11	1990	51	161	1983	3	1990
May	39	76	1986	8	1989	16	84	1983	3	1990
Jun	53	97	1987	26	1992	12	48	1983	3	1992
Jul	53	123	1988	12	1984	11	35	1988	2	1984
Aug	66	110	1986	25	1991	16	55	1985	2	1984
Sep	43	97	1984	13	1989	7	20	1985	2	1989
Oct	64	111	1987	40	1985	33	161	1987	3	1989
Nov	61	106	1984	31	1989	46	155	1984	4	1983
Dec	52	106	1990	17	1988	79	178	1992	26	1984
Year	626	722	1987	453	1989	484	614	1986	136	1989

Station and Catchment Characteristics

Station level	(mOD)	20.30
Sensitivity	(%)	4.8
Bankfull flow		
Catchment area	(km^2)	215.5
Maximum altitude	(mOD)	299
FSR slope (S1085)	(m/km)	
1941-70 rainfall (SAAR)	(mm)	
FSR stream frequency (STMFRQ)	(junctions/km^2)	
FSR percentage urban (URBAN)		

Station and Catchment Description

Flat V weir (theoretical rating - modularity assumed). Subject to drowning; backing-up from Swale (d/s weedgrowth can also affect low flows).Reverse flows observed under low flow conditions. Flows should be treated with caution. Little artificial disturbance to the flow regime.

A low-lying, largely rural catchment developedmostly on Permian/Triassic formations (sandstones and mudstones), with extensive Drift cover.

Factors Affecting Runoff

Summary of Archived Data

Gauged Flows and Rainfall

	0	1	2	3	4	5	6	7	8	9
1980s	e	a	d	a	A	A	A	A	A	A
1990s	A	A	A							

Key:	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

Naturalised Flows

Key:	
All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

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12th July 1994

National River Flow Archive
Data Retrieval Service

River Flow Measuring Station Information Sheet

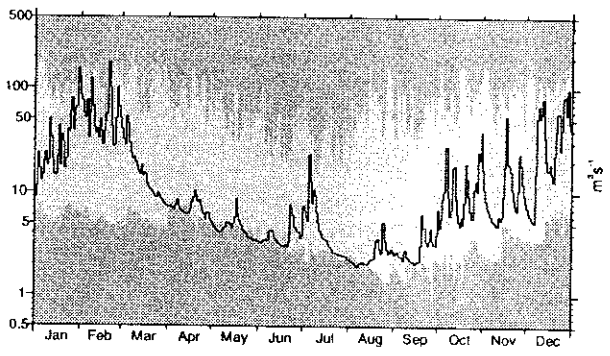
Swale at Crakehill

Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 425 734
Station Type: Crump weir/Velocity-area

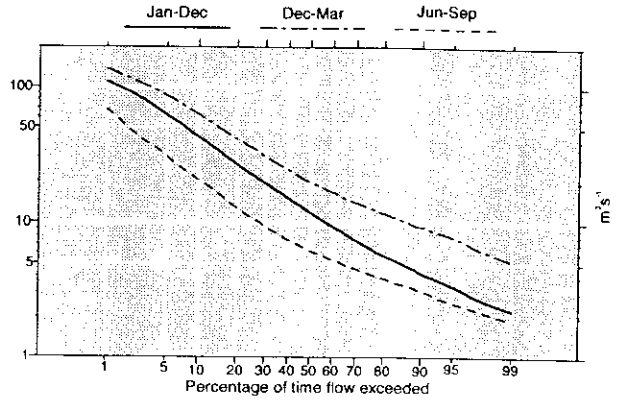
Gauged Flows and Rainfall: 1955-1992
IH Station Number: 27071
Local Number: 8912302

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1955 to 1992 excluding those for the featured year (1990; mean flow: 16.60 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	19.40	
Mean flow (ls^{-1}/km^2)	14.20	
Mean flow ($10^6m^3/yr$)	611.0	
Peak flow / date	255.7	7 Mar 1963
Highest daily mean / date	246.6	7 Mar 1963
Lowest daily mean / date	0.858	27 Sep 1959
10 day minimum / end date	1.483	29 Aug 1976
60 day minimum / end date	1.998	18 Oct 1959
240 day minimum / end date	5.510	13 Nov 1959
10% exceedance (Q10)	42.640	
50% exceedance (Q50)	11.860	
95% exceedance (Q95)	3.376	
Mean annual flood		
IH Baseflow index	0.48	

Rainfall and Runoff

	Rainfall (1955-1992) mm					Runoff (1955-1992) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	84	151	1984	23	1964	64	112	1982	14	1963
Feb	62	145	1966	8	1985	52	114	1966	10	1963
Mar	67	154	1979	14	1973	52	141	1979	15	1973
Apr	57	121	1983	8	1980	37	89	1986	14	1990
May	56	133	1967	10	1989	25	64	1983	9	1990
Jun	61	144	1980	18	1976	18	44	1958	7	1957
Jul	66	150	1988	16	1984	17	43	1958	5	1984
Aug	83	217	1956	20	1976	23	99	1956	4	1976
Sep	70	186	1976	15	1989	22	63	1956	4	1959
Oct	75	165	1976	18	1969	36	106	1976	8	1972
Nov	79	153	1984	20	1970	45	99	1960	14	1964
Dec	86	188	1978	31	1971	58	123	1979	18	1971
Year	846	1053	1960	610	1964	448	603	1958	259	1964

Station and Catchment Characteristics

Station level	(mOD)	12.00
Sensitivity	(%)	7.6
Bankfull flow		
Catchment area	(km^2)	1363.
Maximum altitude	(mOD)	713
FSR slope (S1085)	(m/km)	
1941-70 rainfall (SAAR)	(mm)	877
FSR stream frequency (STMFRQ)	(junctions/km^2)	
FSR percentage urban (URBAN)		

Station and Catchment Description

Crump profile weir with high flow calibration based on u/s cableway (at Leckby Grange). Flows prior to June 1980 derived exclusively from Leckby Grange (station 027008, C.A.: 1345.6 sq.kms - variable low flow control, weedgrowth especially severe in 1976 - July/Aug. flows estimated). Sensibly natural regime, flashy response.

Rural catchment draining the northern Yorkshire Dales, lower catchment in the flat Vale of York. Mixed geology - mainly limestones, sandstones (especially below Richmond) and shales; covering of Boulder Clay.

Factors Affecting Runoff

- Natural to within 10% at the 95 percentile flow.

Summary of Archived Data

Gauged Flows and Rainfall

Key:	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

	0	1	2	3	4	5	6	7	8	9
1950s	-	-	-	-	-	e	A	A	A	B
1960s	A	A	A	A	A	A	A	A	A	A
1970s	A	A	A	A	A	E	B	E	A	E
1980s	A	A	A	A	A	A	A	A	A	A
1990s	A	A	A							

Naturalised Flows

Key:

All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

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12th July 1994

National River Flow Archive
Data Retrieval Service

River Flow Measuring Station Information Sheet

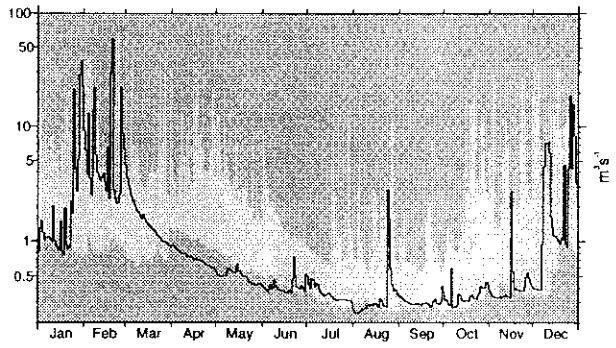
Bedale Beck at Leeming

Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 306 902
Station Type: Flat V

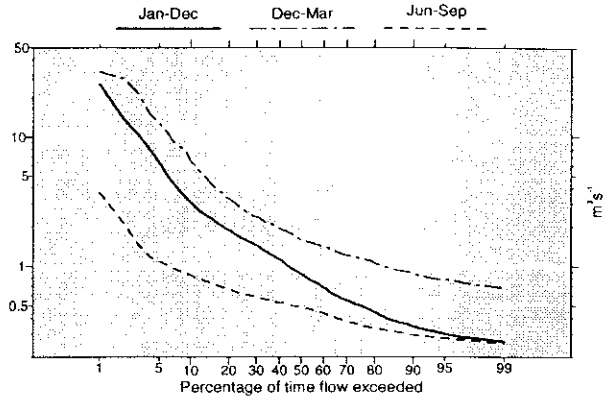
Gauged Flows and Rainfall: 1983-1992
IH Station Number: 27075
Local Number: 8912330

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1983 to 1992 excluding those for the featured year (1990; mean flow: 1.84 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	1.96	
Mean flow (ls^{-1}/km^2)	12.20	
Mean flow ($10^6m^3/yr$)	61.8	
Peak flow / date	121.3	26 Aug 1986
Highest daily mean / date	82.3	26 Aug 1986
Lowest daily mean / date	0.234	30 Sep 1989
10 day minimum / end date	0.252	6 Oct 1989
60 day minimum / end date	0.276	18 Oct 1989
240 day minimum / end date	0.424	6 Dec 1990
10% exceedance (Q10)	3.165	
50% exceedance (Q50)	0.842	
95% exceedance (Q95)	0.299	
Mean annual flood		
IH Baseflow index	0.45	

Rainfall and Runoff

	Rainfall (1987-1992) mm					Runoff (1983-1992) mm				
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr		Min/Yr	
Jan	60	105	1990	14	1989	69	111	1991	18	1989
Feb	65	113	1990	29	1992	62	137	1984	14	1992
Mar	57	76	1987	14	1990	45	85	1991	23	1985
Apr	44	66	1989	10	1990	38	108	1986	12	1990
May	26	55	1988	6	1989	22	67	1983	8	1990
Jun	56	96	1987	23	1992	12	36	1983	7	1990
Jul	55	126	1988	25	1990	10	24	1988	5	1984
Aug	57	87	1992	25	1991	15	58	1986	5	1984
Sep	43	86	1992	10	1989	8	12	1985	4	1989
Oct	78	117	1987	54	1992	19	77	1987	5	1989
Nov	58	89	1991	31	1990	28	69	1984	7	1983
Dec	62	118	1990	29	1988	57	121	1992	24	1984
Year	661	772	1988	516	1989	386	531	1986	223	1989

Station and Catchment Characteristics

Station level	(mOD)	
Sensitivity	(%)	
Bankfull flow		
Catchment area	(km^2)	160.3
Maximum altitude	(mOD)	
FSR slope (S1085)	(m/km)	
1941-70 rainfall (SAAR)	(mm)	
FSR stream frequency (STMFRQ)	(junctions/km^2)	
FSR percentage urban (URBAN)		

Station and Catchment Description

Flat V weir, 1:10 cross-slope. High flow record is suspect - the structure drowns as a result of backing-up from the Swale (a chart recorder monitors d/s levels but processed flows assume modularity). Considerable spray irrigation in the lower reaches otherwise minimal artificial impact on flow regime.

Rural, W-E trending catchment draining from Bellerby Moor.

Factors Affecting Runoff

Summary of Archived Data

Gauged Flows and Rainfall

	0	1	2	3	4	5	6	7	8	9
1980s	-	-	-	e	a	a	a	A	A	A
1990s	A	D	A							

Key:	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

Naturalised Flows

Key:	
All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

National River Flow Archive
Data Retrieval Service

River Flow Measuring Station Information Sheet

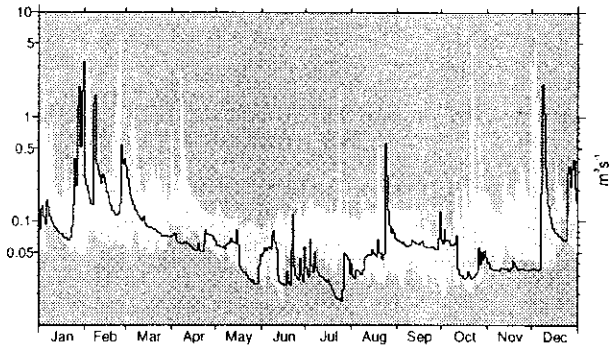
Cundall Beck at Bat Bridge

Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 419 724
Station Type: Flat V

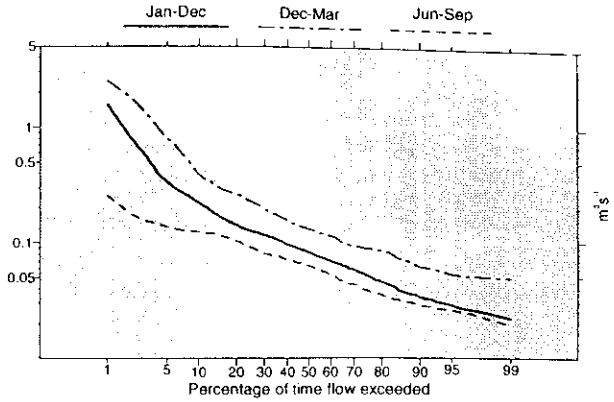
Gauged Flows and Rainfall: 1987-1992
IH Station Number: 27082
Local Number: 8912311

Daily Flow Hydrograph

Max. and min. gauged daily mean flows from 1987 to 1992 excluding those for the featured year (1990; mean flow: 0.12 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	0.14	
Mean flow (ls^{-1}/km^2)	0.00	
Mean flow ($10^6m^3/yr$)	4.6	
Peak flow / date	7.3	3 Dec 1992
Highest daily mean / date	6.6	3 Dec 1992
Lowest daily mean / date	0.016	15 Jun 1992
10 day minimum / end date	0.097	26 Jul 1990
60 day minimum / end date	0.043	29 Oct 1991
240 day minimum / end date	0.048	4 Jan 1992
10% exceedance (Q10)	0.221	
50% exceedance (Q50)	0.082	
95% exceedance (Q95)	0.028	
Mean annual flood		
IH Baseflow index	0.51	

Rainfall and Runoff

	Rainfall (1987-1992) mm					Runoff mm		
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr	Min/Yr
Jan	48	89	1988	10	1989			
Feb	52	87	1990	22	1992			
Mar	47	72	1987	9	1990			
Apr	36	53	1989	10	1990			
May	26	53	1988	4	1989			
Jun	56	88	1987	18	1992			
Jul	54	130	1988	11	1991			
Aug	59	92	1992	9	1991			
Sep	38	81	1992	7	1989			
Oct	66	109	1987	49	1990			
Nov	48	75	1992	17	1990			
Dec	46	93	1990	19	1988			
Year	576	688	1988	442	1989			

Station and Catchment Characteristics

Station level	(mOD)
Sensitivity	(%)
Bankfull flow	
Catchment area	(km^2)
Maximum altitude	(mOD)
FSR slope (S1085)	(m/km)
1941-70 rainfall (SAAR)	(mm)
FSR stream frequency (STMFRQ)	(junctions/km^2)
FSR percentage urban (URBAN)	

Station and Catchment Description

Flat V weir, 1:10 cross-slope(superseded an original sharp-edged weir). Drowning is rare and flow regime is subject to only modest disturbance- some augmentation from groundwater can occur in the summer when spray irrigation demand can be significant.

A low-lying, relatively flat catchment - developed on Permo-Triassic sandstones- draining to the Swale.Land use is dominantly agricultural.

Factors Affecting Runoff

Summary of Archived Data

Gauged Flows and Rainfall

	0	1	2	3	4	5	6	7	8	9
1980s	-	-	-	-	-	-	-	A	A	A
1990s	A	A	A							

Key:	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

Naturalised Flows

Key:	
All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=

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12th July 1994

River Flow Measuring Station Information Sheet

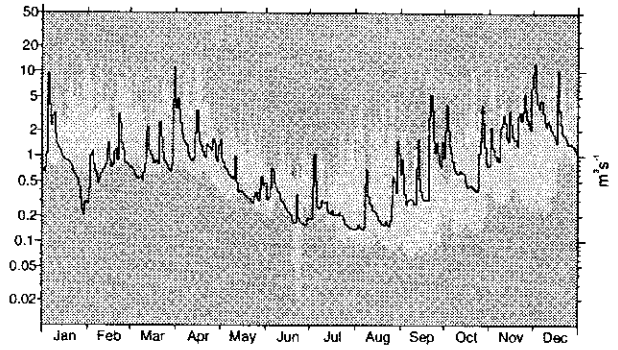
Skell at Alma Weir

Measuring Authority: NRA - Yorkshire
Grid Reference: 44 (SE) 316 709
Station Type: Flat V

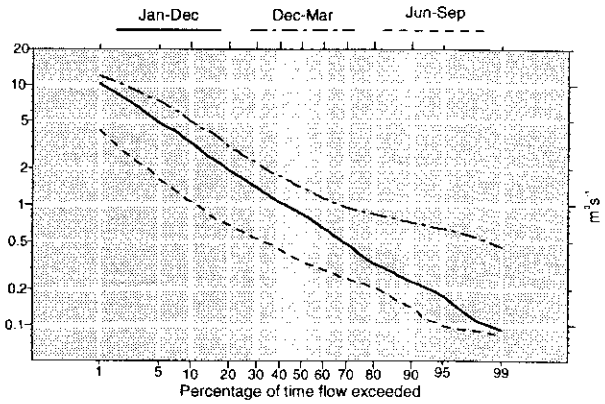
Gauged Flows and Rainfall: 1984-1992
IH Station Number: 27086
Local Number: 8912216

Daily Flow Hydrograph

Max. and min. daily mean flows from 1984 to 1992 excluding those for the featured year (1992; mean flow: 1.18 m^3s^{-1})



Flow Duration Curve



Flow Statistics

(Units: m^3s^{-1} unless otherwise stated)

Mean flow	1.37	
Mean flow (ls^{-1}/km^2)	-0.01	
Mean flow ($10^6m^3/yr$)	43.4	
Peak flow / date	42.6	17 Apr 1986
Highest daily mean / date	23.2	17 Apr 1986
Lowest daily mean / date	0.020	23 Jun 1988
10 day minimum / end date	0.070	13 Sep 1991
60 day minimum / end date	0.102	28 Sep 1990
240 day minimum / end date	0.301	6 Dec 1990
10% exceedance (Q10)	3.250	
50% exceedance (Q50)	0.849	
95% exceedance (Q95)	0.176	
Mean annual flood		
IH Baseflow index	0.47	

Rainfall and Runoff

	Rainfall (1992-1992) mm					Runoff mm		
	Mean	Max/Yr		Min/Yr		Mean	Max/Yr	Min/Yr
Jan	50	50	1992	50	1992			
Feb	51	51	1992	51	1992			
Mar	97	97	1992	97	1992			
Apr	72	72	1992	72	1992			
May	41	41	1992	41	1992			
Jun	26	26	1992	26	1992			
Jul	64	64	1992	64	1992			
Aug	116	116	1992	116	1992			
Sep	114	114	1992	114	1992			
Oct	67	67	1992	67	1992			
Nov	114	114	1992	114	1992			
Dec	82	82	1992	82	1992			
Year	894	894	1992	894	1992			

Station and Catchment Characteristics

Station level	(mOD)
Sensitivity	(%)
Bankfull flow	
Catchment area	(km^2)
Maximum altitude	(mOD)
FSR slope (S1085)	(m/km)
1941-70 rainfall (SAAR)	(mm)
FSR stream frequency (STMFRQ)	(junctions/km^2)
FSR percentage urban (URBAN)	

Station and Catchment Description

Flat V weir. Considerable accretion on u/s apron. Substantial modular range. Offtake to Ripon Canal feeder is u/s. Swallow holes u/s of Laver/Skell confluence greatly reduce summer flows.

A rural catchment below moorland (Pennine) headwaters. Developed mostly on Millstone Grit and Magnesian Limestone.

Factors Affecting Runoff

Summary of Archived Data

Gauged Flows and Rainfall

	0	1	2	3	4	5	6	7	8	9
1980s	-	-	-	-	e	a	a	a	a	e
1990s	a	d	A							

Key:	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	=	-

Naturalised Flows

Key:	
All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	=